

# PortaSound

## PSS-480

### **MUSIC STATION**

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OPERATING MANUAL  
MANUEL D'UTILISATION  
BEDIENUNGSANLEITUNG  
MANUAL DE INSTRUCCIONES

**YAMAHA**

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# INTRODUCTION

*Congratulations on your purchase of the Yamaha PortaSound PSS-480!  
You now own one of the most sophisticated portable electronic keyboards available.  
Controlled by an advanced microcomputer, the PortaSound PSS-480 offers far more  
musical enjoyment and versatility than any other instrument in its class. In fact, it gives  
you the fun and functions of a whole host of digital music machines, namely ...*

- An **electronic keyboard** offering 100 high-quality preset voices using the famous Yamaha FM sound source.
- A **digital synthesizer** that lets you alter any of the preset voices to taste and save up to five of these edited versions.
- A versatile **rhythm machine** using 9 percussion instruments, PCM recorded for breath-taking realism. With 100 basic rhythm patterns featuring three intros/fill-ins and one ending each, you have an amazing 400 rhythm variations at your disposal. What's more, you can even record your own original Custom Drummer pattern.
- A sophisticated **automatic accompaniment system** giving you Single Finger Chords, automatic bass, chords and orchestra, automatic Duet and orchestration capabilities.
- A simple but very useful **sequencer** offering unique musical possibilities: You can digitally record up to five melodies and chord progressions each and play them back any time at the touch of a button.
- A highly advanced **MIDI controller and multi-timbral MIDI sound source**. Used as a controller, the PortaSound can play a number of external MIDI instruments simultaneously on various channels. As a sound source, it will perform several voices as well as percussion independently at the same time.

Read this manual carefully while playing your new PortaSound, and you will be able to make full use of its many fantastic features in no time.

## ABOUT THIS MANUAL

One look at your new PortaSound PSS-480 tells you: this is an advanced instrument with a great variety of functions. Though this is true, don't let the large number of buttons fool you — the PSS-480 is actually very easy to use. As you can see from the **INDEX ILLUSTRATION** on p. 6, the controls are all organized in easy-to-understand functional groups. Once you get to know them, you will have no trouble operating your PortaSound, making it do exactly what you want it to.

To get acquainted with your new keyboard and have fun with it from the start, please read **PART I** first. You can then use the **INDEX ILLUSTRATION** to look up information on buttons or functional groups you are especially interested in right away. Otherwise, continue with **PART II**.

This manual is structured into three main parts. The shortest and simplest one, **PART I — GETTING TO KNOW THE PSS-480**, gives you all the information you need to play your new instrument, making use of its most basic features. It also shows you how you can listen to the pre-programmed **DEMONSTRATION** song.

The functions mentioned shortly in the **QUICK GUIDE** illustration of **PART I** are explained in greater detail in **PART II**. Particularly if you already have some experience with digital

keyboards, the **QUICK GUIDE** will enable you to use these functions immediately. On the other hand, if you are a total newcomer, reading the next part will make operations clearer to you.

**PART II — BASIC FEATURES** contains a systematic overall introduction of **WHAT YOUR PortaSound CAN DO**, followed by detailed explanations of most PortaSound functions. It tells you all about voice and style selection, effects, the Auto Accompaniment features and the Song Memory.

Each section starts out with a short **Overview** giving you a general idea of the respective functions. You can then try them out right away by following the steps described under **Operation**. Note that in the text, bold print indicates basic operational steps, while the regular print below it gives all the necessary explanations. Therefore, you can simply follow the instructions in bold print when you want to get to know a feature, and read the details and **Points to Remember** later.

Finally, **PART III** shows you how to use those **ADVANCED FEATURES** that require a bit of specialized know-how — the Digital Synthesizer section to create your own FM sounds, and the MIDI functions for communication with other MIDI instruments, sequencers and computers.

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## PRECAUTIONS — TAKING CARE OF YOUR PORTASOUND

*Your new PortaSound is a fine musical instrument — and should be treated as such.  
Handle it with care and common sense, and it will give you years of enjoyment.*

### ● Location

Avoid exposure to direct sunlight or other sources of heat. Never leave it inside a car where it can get very hot. Vibration, excessive dust, cold, low or high humidity can also cause malfunction.

### ● Handling

Avoid rough handling. Don't drop or jolt the PortaSound as this can damage the internal circuitry. Pressing too hard on keys or controls may lead to malfunctions. When cords are plugged into the rear panel jacks, pay particular attention not to apply excessive force to them since this may damage the terminals.

### ● Adaptors

Use only the power adaptor described in the POWER section. Disconnect the AC adaptor when not using your PortaSound.

### ● Batteries

- When not using your PortaSound for long periods, be sure to remove the batteries to avoid damage through battery leakage.
- Replace weak batteries before they run down completely.

- Always replace all batteries with new ones.
- Do not use different kinds of batteries at the same time.
- In case electrolyte has leaked into the battery compartment, wipe it off completely before installing new batteries.
- Never disassemble, heat or throw discarded batteries into a fire. Dispose of them properly.

### ● Cleaning

Clean the exterior with a soft, dry cloth. Using chemical solvents will damage the finish.

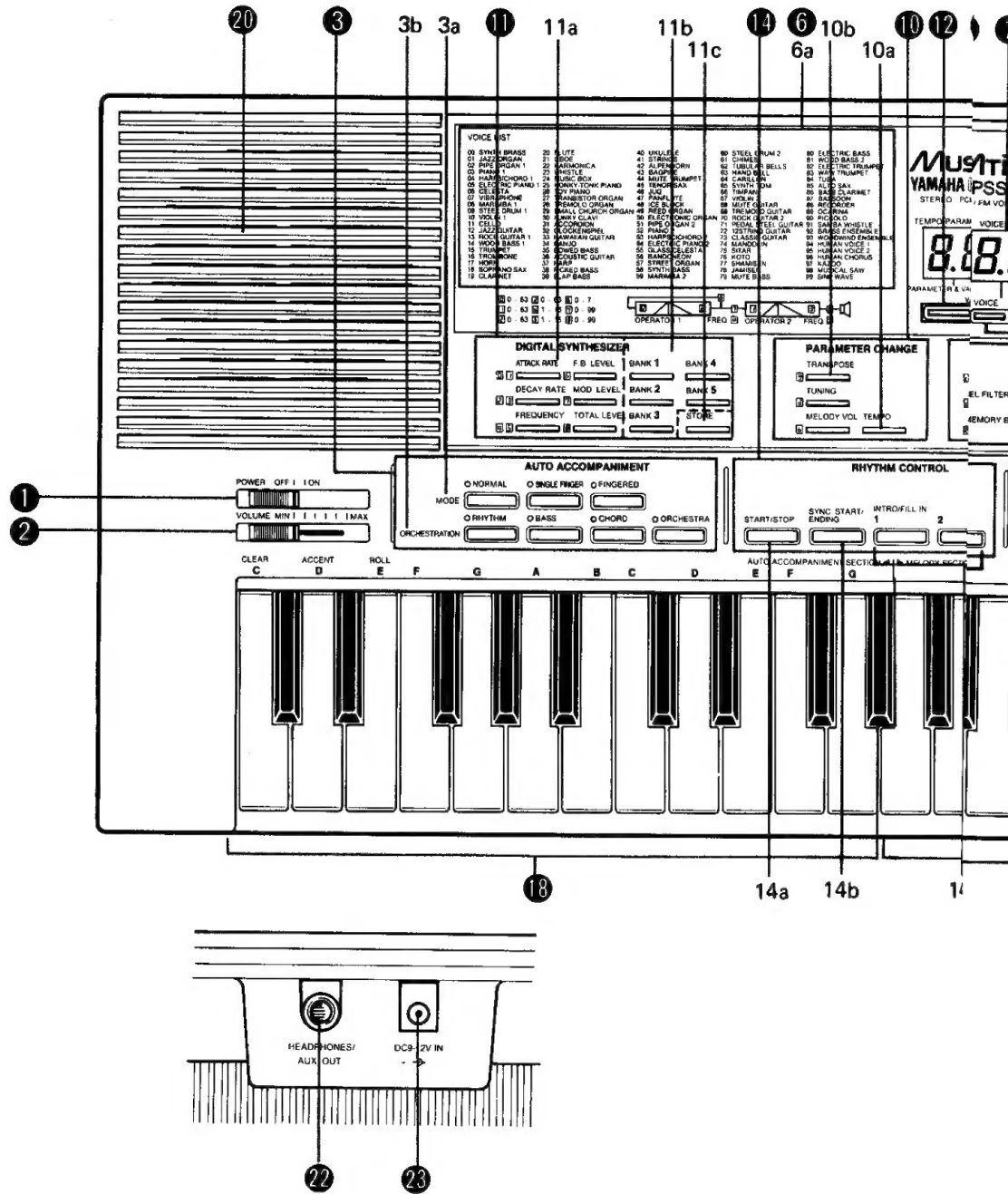
### ● Interference Through Electromagnetic Fields

Do not use your PortaSound close to television sets or other equipment receiving electromagnetic signals as this could cause interference noise in the other appliance.

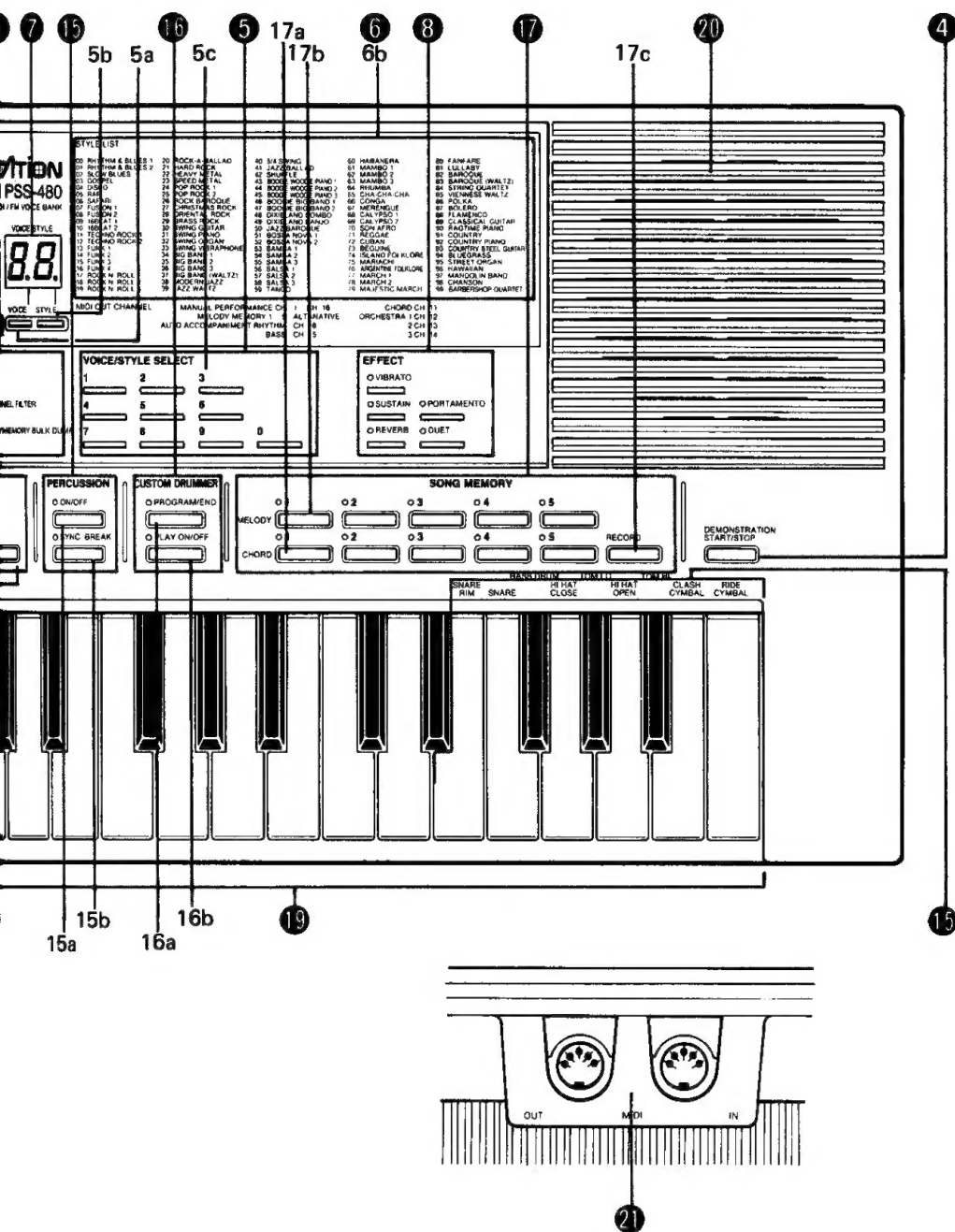
### ● Service and Modifications

Your PortaSound contains no user serviceable parts. Opening it or tampering with it in any way can lead to electrical shock as well as damage. Of course, any resulting damage will no longer be repaired free of charge. Refer all servicing to qualified YAMAHA personnel.

# CONTROL PANEL



- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| ① POWER switch                    | ⑦ VOICE/STYLE number display        |
| ② VOLUME slider                   | ⑧ EFFECT selectors                  |
| ③ AUTO ACCOMPANIMENT group        | ⑨ MIDI group                        |
| 3a MODE selectors                 | ⑩ PARAMETER CHANGE group            |
| 3b ORCHESTRATION buttons          | 10a TEMPO button                    |
| ④ DEMONSTRATION START/STOP switch | 10b Parameter selectors             |
| ⑤ VOICE/STYLE SELECT buttons      | ⑪ DIGITAL SYNTHESIZER group         |
| 5a VOICE switch                   | 11a Synthesizer Parameter selectors |
| 5b STYLE switch                   | 11b Voice BANK selectors            |
| 5c Number buttons                 | 11c STORE button                    |
| ⑥ VOICE/STYLE LIST                | ⑫ VALUE buttons                     |
| 6a VOICE LIST                     | ⑬ TEMPO/PARAMETER & VALUE display   |
| 6b STYLE LIST                     |                                     |



- 1 RHYTHM CONTROL buttons
- 14a START/STOP switch
- 14b SYNCHRO START/ENDING control
- 14c INTRO/FILL IN buttons
- 15 PERCUSSION keys
- 15a ON/OFF
- 15b SYNCHRO BREAK switch
- 16 CUSTOM DRUMMER controls
- 16a PROGRAM/END
- 16b PLAY ON/OFF

- 17 SONG MEMORY
  - 17a CHORD bank selectors
  - 17b MELODY bank selectors
  - 17c RECORD button
  - 18 AUTO ACCOMPANIMENT SECTION
  - 19 MELODY SECTION
  - 20 Built-in speakers
- REAR PANEL
- 21 MIDI terminals
  - 22 HEADPHONES/AUX. OUT jack
  - 23 DC(9-12V)IN AC power adaptor terminal

# PART I

## GETTING TO KNOW THE PSS-480

This part of the manual first shows you how to provide the PSS-480 with **POWER**, using batteries or an AC adaptor. You can then turn it on and start **PLAYING** it right away.

Next, listen to a **DEMONSTRATION** of what the PortaSound PSS-480 can do. Reading PART II will then enable to perform this kind of professional-sounding music all by yourself.

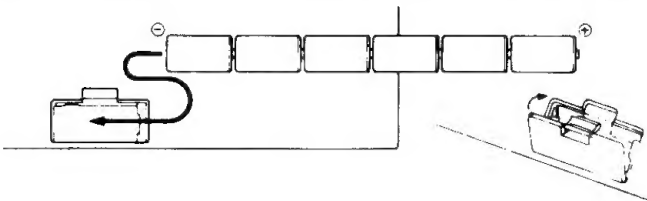
The **QUICK GUIDE** briefly introduces the most basic features without going into detail so you can enjoy yourself experimenting and discovering.

### POWER

Your PortaSound PSS-480 works on batteries or household current. Since batteries are also needed to support the internal RAM memory, buy six 1.5V SUM-2 alkaline batteries. (Be sure to read the precautions concerning batteries on p. 1). To save battery power, you can also use a Yamaha PA-3, PA-4 or PA-40 AC adaptor.

#### Inserting Batteries

Turn the instrument upside-down and remove the battery compartment lid by pushing its tab in the direction of the arrow embossed on the lid. Insert the six batteries, making sure that their poles are aligned as shown in the illustration below. Replace the lid. It should lock in place with a click.



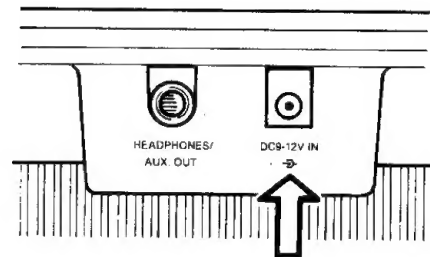
#### Low Battery Warning

When the battery voltage drops below a certain level, the LED displays will start to blink. As soon as this happens, replace all six batteries with new ones. If you allow the batteries to become spent completely, any data you have stored in the internal memories will be lost.

#### Using an AC Power Adaptor

When you want to connect your PortaSound to a wall socket, buy a Yamaha PA-3, PA-4 or PA-40 Power Adaptor. No other adaptor can be used, so be sure to ask for the right kind.

Plug the adaptor into a convenient wall socket and its connector into the DC(9-12V)IN terminal on the back of your PortaSound as shown. (Even when power is turned off, the AC adaptor back up the PortaSound RAM memory.)



### PLAYING

Slide the **POWER** switch (1) toward the right to the **ON** position. The LED displays and various indicators will light up to confirm that the PortaSound is turned on.

You can now play the keyboard. Adjust the sound level with the **VOLUME** slider (2), pushing it toward **MAX** to increase volume and to the left (**MIN**) down to lower it.

- Be sure to turn your PortaSound off again by sliding the **POWER** switch (1) back to **OFF** after you have finished playing. This will save battery power.

### DEMONSTRATION

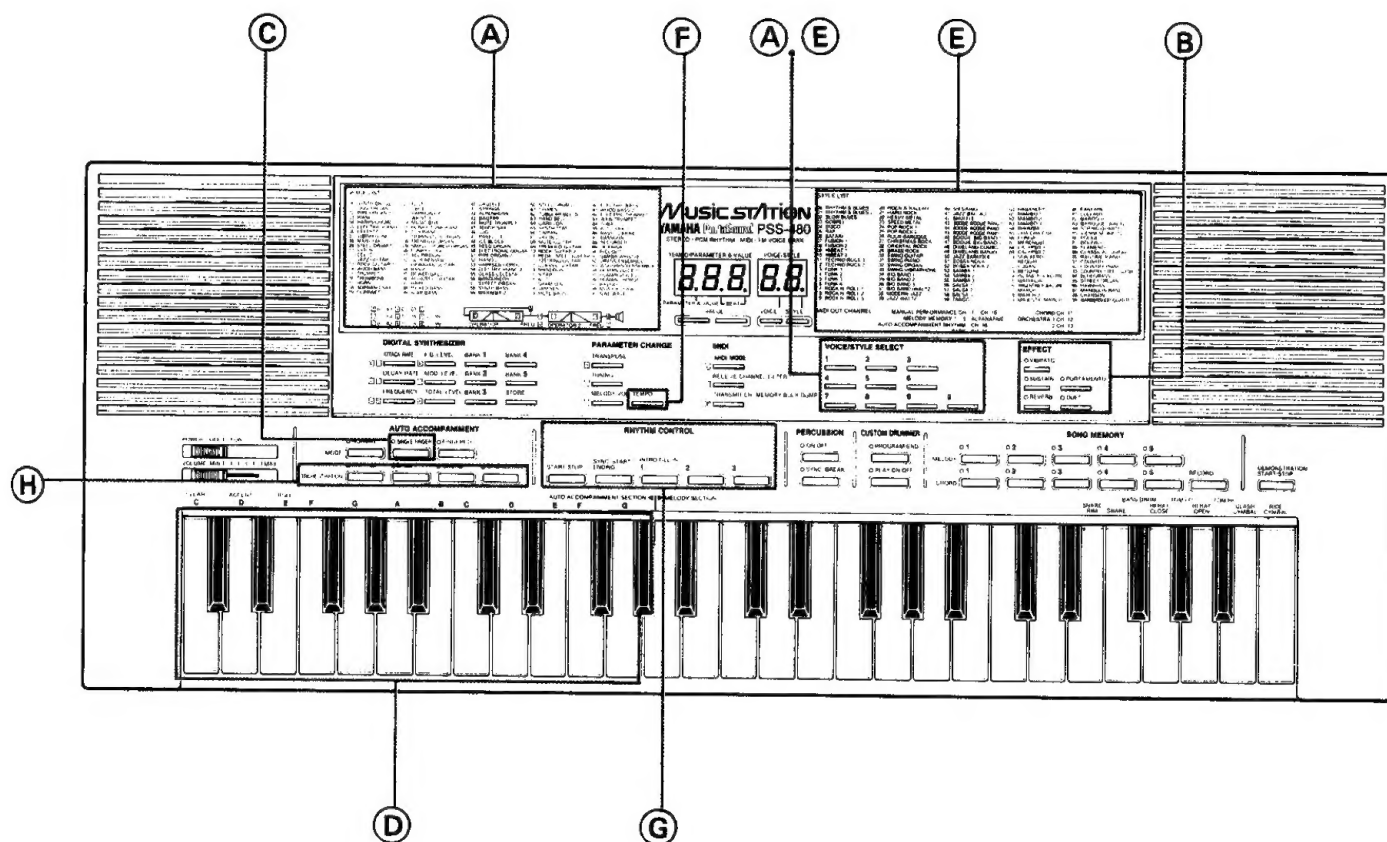
To get an idea of the music your new PortaSound is capable of playing, listen to the factory-programmed demonstration song. Start it by pressing the yellow **DEMONSTRATION START/STOP** button (4).

- The song will continue until you press **DEMONSTRATION START/STOP** again, or the **START/STOP** switch.

You will soon be playing music in this kind of professional style by yourself — **PART II** will teach you all the necessary operations. Most of these steps can also be carried while the PortaSound is performing the demonstration song, allowing you to alter this song according to your taste.



# QUICK GUIDE



## A Selecting Voices

To choose any instrument sound you like, simply look up its name in the VOICE LIST (6a) and input the corresponding number with the number buttons (5c). (It may be necessary to press the green VOICE switch (5a) first.)

## B Effects

Add special effects to the instrument sounds by pressing these selectors.

## C Single Finger Chords

You can play entire chords automatically with just a finger or two — press the SINGLE FINGER selector (3a), then play keys in the AUTO ACCOMPANIMENT SECTION (18).

## D Automatic Accompaniment

With SINGLE FINGER mode on, press the red START/STOP switch (14a) to start the rhythm. Play the AUTO ACCOMPANIMENT SECTION and enjoy automatic bass, chord and orchestra accompaniment. To stop it, press SYNCHRO START/ENDING (14b).

## E Selecting Styles

The STYLE LIST (6b) shows you which rhythm and accompaniment styles you can choose from. Press the yellow STYLE (5b) switch, then enter the desired style number with the number buttons (5c).

## F Tempo

To adjust the speed of the rhythm/accompaniment, press TEMPO (10a), then use the VALUE buttons (12) to make it faster or slower.

## G Rhythm Control

START/STOP (14a) starts or stops the selected rhythm. Press the yellow INTRO/FILL IN buttons (14c) instead for a different beginning or for variations while the drum sounds are playing. (Works for Auto Accompaniment too.) SYNCHRO START/ENDING (14b) lets the rhythm begin automatically when you play the AUTO ACCOMPANIMENT SECTION (18), or ends it with a special pattern.

## H Orchestration

These switches (3b) turn the four components of the Auto Accompaniment — bass, rhythm (drums), chords and orchestra parts — on and off to suit your music.



# INDEX ILLUSTRATION

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AUTO ACCOMPANIMENT MODE ..... 17

DIGITAL SYNTHESIZER ..... 25

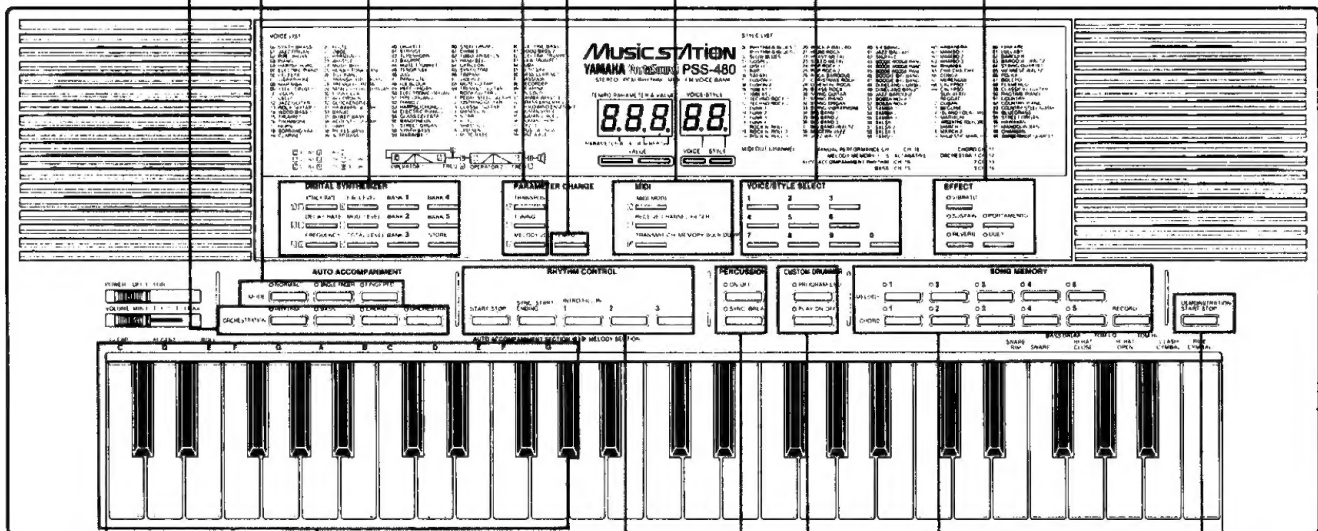
PARAMETER CHANGE ..... 10

TEMPO ..... 13

MIDI ..... 29

VOICE/STYLE SELECT ... 8 (VOICE), 12 (STYLE)

EFFECTS ..... 9



DEMONSTRATION ..... 4

SONG MEMORY ..... 21

CUSTOM DRUMMER ..... 14

PERCUSSION ..... 14

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AUTO ACCOMPANIMENT SECTION ..... 17

# PART II

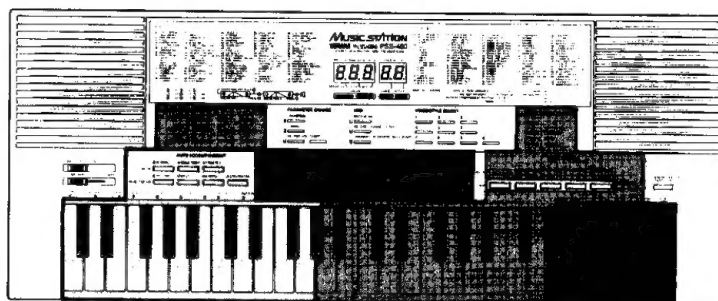
## BASIC FEATURES

### WHAT YOUR PortaSound CAN DO

Using the QUICK GUIDE and listening to the DEMONSTRATION song has already given you a first impression of your new PortaSound's capabilities. This chapter tells you more about them.

#### Voices, Rhythm and Auto Accompaniment

To better understand the PortaSound's functional structure, think of it as comprising the following three sections:



Auto Accompaniment Section  
Voice/Melody Section  
Rhythm Section

As the names say, the Voice/Melody Section controls all features concerning the voices you play, usually in the form of a melody, while the Auto Accompaniment Section helps you perform the accompaniment to these melodies. The Rhythm Section can be used separately like a drum machine, or in combination with Auto Accompaniment.

- This is not a strict division. These sections are closely interconnected — for instance, RHYTHM CONTROL influences both the Rhythm and the Auto Accompaniment Sections, and the SONG MEMORY MELODY banks are just as much part of Voice/Melody as they are of Auto Accompaniment. Keeping this division in mind, though, makes it easier to understand the PortaSound features.

#### Voice/Melody Section

In the tradition of Yamaha's famous DX7 synthesizers, the preset instrument sounds available on the PortaSound PSS-480 are referred to as "voices". With the Digital Synthesizer functions explained in PART III (p.25), you can alter them to create your own original sounds, then save up to five of these for instant access at the push of a button. For more expressiveness and realism, you can add various EFFECTS (p.9) to the voices. PORTAMENTO, for instance, can greatly enhance strings, brass or bass sounds.

#### Easy Play Functions

If the melody you want to play is in a difficult key, you can TRANSPOSE the entire keyboard (p.10) to an easier one.

Melodies (or parts of them) you find particularly hard to perform can be memorized in the MELODY banks of the SONG MEMORY (p.21). For example, if a phrase is too fast for you, record it at a comfortable slow tempo and then play it back any time at the correct speed by simply pressing the corresponding MELODY button.

#### Rhythm and Auto Accompaniment Sections

Since these sections are so closely interrelated, many of their functions are treated together in this manual.

The Rhythm and Auto Accompaniment features can enhance your performances in four basic ways: The PortaSound PSS-480 is capable of

1. playing a rhythm accompaniment to your music with realistic percussion sound patterns in a hundred different musical styles, functioning like a high-quality drum machine. Many variations of these basic patterns are possible with RHYTHM CONTROL.
2. letting you play complete chords by using only a single finger of your left hand (SINGLE FINGER chords).
3. performing an entire accompaniment arrangement, complete with drums, bass, chords and orchestra, easily controlled by your left hand. Again, RHYTHM CONTROL can be used to add a great number of variations. You can even change the ORCHESTRATION, deleting or adding parts to the accompaniment at the touch of a button.

4. digitally recording whole melodies or various melody sections as well as entire chord progressions in the SONG MEMORY. These can be played back at the touch of a button. The PSS-480 thus also does the job of a simple but particularly flexible sequencer — you can use it either for totally automatic performances, or to enhance any music you are playing live.

In addition, you can record your own original CUSTOM DRUMMER pattern.

## Headphones

For private practicing and playing without disturbing others, connect headphones to the rear panel HEADPHONES/AUX. OUT jack (22). The built-in speakers (20) are automatically cut off when you insert a headphone plug into this jack.

## Connecting the PSS-480 to Your Stereo

For a truly powerful sound, connect the HEADPHONES/AUX. OUT jack on the rear panel of the PortaSound to your stereo system with an optional cable.

- Be sure to turn the PortaSound's power off when making this connection.  
Reduce the VOLUME (2) on the PortaSound and adjust the sound level with your stereo's volume control.
- Only the PCM percussion sounds have distinct left or right positions in the stereo field, while the FM voices are all centered.

# VOICE/MELODY SECTION

## SELECTING A VOICE

### ■ Overview

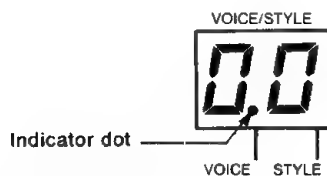
100 preset FM voices are yours for the choosing. Each voice has its own number, indicated in white next to its name in the VOICE LIST (6a), for instant access.

Selecting a voice is very easy, requiring only one or two steps:

### ■ Operation

#### 1. Make sure the VOICE indicator is lit.

Check to see that the dot in the VOICE/STYLE number display (7) is located above "VOICE".



This shows that your PortaSound is ready for voice selection. If it is not, simply press the green VOICE switch (5a), making sure that the VOICE indicator dot lights up.

#### 2. Enter the voice number.

Use the VOICE/STYLE SELECT number buttons (5c) to input the number of the desired voice.

### Points to Remember

- Notice that all voice numbers have two digits. Both must be entered for the instrument sound to change. (The first ten voice numbers start with a "0", which you also have to input.)
- You can always check the currently selected voice by looking at the VOICE/STYLE display (making sure the VOICE indicator is lit).
- When POWER is turned on, the voice chosen before the PSS-480 was turned off is selected automatically.
- With each voice, up to twelve keys can be played at the same time — in other words, the PSS-480 is 12-voice polyphonic.

To appreciate the amazing variety of realistic FM instrument sounds now at your disposal, try out as many voices as you like right now.

### Playing Along with the Demo Song

If you want, you can even play along with the demonstration song using any instrument of your choice. To do so, select a voice, press the yellow DEMONSTRATION START/STOP switch and play. You can change to other voices any time.

- When playing along like this, you can only play single notes at a time (= "monophonic" performance).

### A TIP: Using the Digital Synthesizer Memory Banks for One-Touch Voice Selection.

Sometimes you will want to change voices while playing — but you may not have enough time to look up a voice number and input its two digits during a performance.

For instant access at the touch of a button, you can store up to five selected voices in the Digital Synthesizer Memory BANKS 1 thru 5 (11b).

### ■ Operation

1. Select the voice you want to store.
  2. Hold down the red STORE button (11c) and simultaneously press the desired BANK button (11b), for example BANK 1. The VOICE/STYLE display will indicate "b.1". The selected voice is now stored in BANK 1 and can be recalled any time by pressing that button.
- Stored voices are retained in their banks even when POWER is turned off.
  - Saving voice data to a bank deletes any previous settings already stored there.

## EFFECTS

### ■ Overview

The PSS-480 offers five different kinds of effects, described below, which can be added to the FM instrument voices for even greater tonal variation. They do not affect the PCM percussion sounds.

### ■ Operation

1. To obtain the effect you want, simply press the corresponding button in the EFFECT group.  
The little red indicator next to it will light up, showing that an effect has been selected. You can use several or all effects at the same time.

#### Points to Remember

- DUET and PORTAMENTO depend on other settings as well — see below for details.
- Some preset voices are already programmed with effects — for instance, VIOLIN 1 (10) and STRINGS (41) use vibrato, HARP (37) sustain, and so on. In such cases, the corresponding EFFECT indicator will light up whenever that instrument is selected. For these instruments, you can of course turn OFF that effect by pressing its selector.
- The effects do not influence the auto accompaniment or rhythm sounds.
- Effects can be stored independently for each SONG MEMORY MELODY bank (see p.21.). During bank playback, these individual effect settings are used automatically and cannot be canceled with the EFFECT selectors.

Try out all five effects to understand how they work and how they influence each instrument sound differently. Here is a

short explanation of what each effect does, and how to adjust PORTAMENTO:

### VIBRATO

Vibrato regularly (cyclically) raises and lowers the pitch of a sound. It occurs naturally in the human voice, and many acoustic instruments, for example strings, make use of it. Usually, this effect does not start right away when a note is sung or played, but after a certain delay time.

The PSS-480 VIBRATO also simulates this natural delay. For an even more realistic effect, each voice has the vibrato delay that suits it best.

### SUSTAIN

Sustain lengthens the release rate of a voice, causing the sound to linger even after the keys have been released. It works rather like the damper pedal of a piano. The sustain effect is also different (longer or shorter) for each voice.

### REVERB

Reverb, short for reverberation, gives a spacious effect similar to an instrument being played in a large hall. It can add atmosphere to almost any voice. Try it with SMALL CHURCH ORGAN (29) or HUMAN VOICES/CHORUS (94 to 96).

### PORTAMENTO

Range: 1 to 5

Portamento is the smooth pitch glide effect that occurs between notes played consecutively on some instruments, such as the violin and trombone, or sung by the human voice. The speed with which the pitch changes between the keys you play can be adjusted over a 5-step range (values from 1 = slow to 5 = fast). Fast settings provide a less extreme effect which can make string instrument voices etc. sound very realistic.

### ■ Operation

1. Hold down the PORTAMENTO button.  
The TEMPO/PARAMETER & VALUE display will now show the current portamento speed setting. To change this value,
  2. keep holding down the PORTAMENTO button and use the VALUE buttons.  
Pressing + increases portamento speed, SHORTENING the portamento time for a LESS pronounced effect. — lowers the speed, so it takes longer for the pitch to change between notes, making the effect more noticeable.
- Be sure to hold down the PORTAMENTO button while changing this setting, otherwise it will not work. Pressing both VALUE buttons + and — simultaneously returns the setting to the default value of 3.
  - The PORTAMENTO setting is retained even when power is turned off.

## DUET

Duet differs from the other effects in that it can only be used in combination with the AUTO ACCOMPANIMENT functions. A detailed explanation of this feature, which automatically adds a second solo instrument to the one you are playing, is given on p.20.

- Note that the Duet effect will not work in the NORMAL AUTO ACCOMPANIMENT mode, even if the DUET button is pressed and its indicator lit.

## PARAMETER CHANGE Settings

### ■ Overview

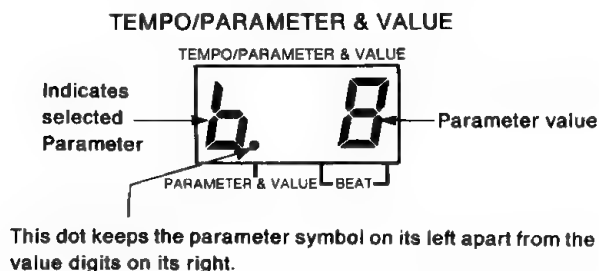
The PARAMETER CHANGE group of buttons (10) consists of the TEMPO button (10a), explained elsewhere (p.13), and the three parameter selectors (10b) TRANSPOSE, TUNING and MELODY VOLUME. Though their functions are not connected, the setting method is the same for the latter three, which is why they are grouped together.

It is a good idea to memorize this basic setting method, since you will be using it for the Digital Synthesizer and MIDI functions as well.

### Parameters and Values

A parameter is simply a setting whose value can be changed. The three parameter selectors (10b) have a white number or letter printed next to them, as do the Digital Synthesizer and MIDI buttons. This is the parameter identification symbol that appears on the TEMPO/PARAMETER & VALUE display, telling you which parameter is currently selected.

Press TRANSPOSE [9], TUNING [d] and MELODY VOLUME [b] one after the other. This calls up each parameter and its current value on the TEMPO/PARAMETER & VALUE display (13).



The single digit left of the dot on the display is the symbol indicating the selected PARAMETER (the symbol also printed next to the button just pressed), in our case [9], [d] or [b]. The one- or two-digit number to the right of the period is the current VALUE of that parameter.

- If there is no dot on the TEMPO/PARAMETER & VALUE display, this means that the display is currently indicating the TEMPO.

Once a parameter is called up on the display, you can change its value with the - and + VALUE buttons (12). Pressing - decreases the value, + increases it. For a more rapid change, hold down either button. Pressing both - and + simultaneously resets the original value (i.e. the value before you started to make changes).

## TRANSPOSE [9] Range: +/- 12 semitones

### ■ Overview

With the exception of the PCM percussion sounds, all PortaSound voices can be transposed over a range of two octaves. In other words, you can use the TRANSPOSE function to raise or lower the pitch of both the MELODY SECTION and the AUTO ACCOMPANIMENT SECTION in semitone steps.

This feature has mainly two applications. First, it lets you set the pitch of the entire keyboard to the easiest key for you to play in. For example, if a song is in B major and you find it difficult to perform in that key, all you have to do is lower the keyboard pitch by a half-tone with TRANSPOSE. Now, if you play the same song in the easy key of C major on the PortaSound keyboard, its pitch will automatically be transposed downward (lowered) by a semitone, so that in effect you will hear it in B major. This is sometimes handy when playing along with other instruments, too.

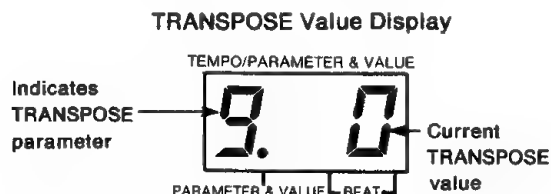
TRANSPOSE can also be used to raise or lower the pitch of the PortaSound by an octave in order to change the mood of the music or adapt the note range to the character of the instrument voice — e.g. transposing it downward for a deeper and more powerful electric bass sound.

Note, however, that octave transposition is only effective for melody voices — the auto accompaniment section returns to original pitch when a TRANSPOSE value of + or - 12 is entered.

### ■ Operation

#### 1. Press TRANSPOSE [9].

The TEMPO/PARAMETER & VALUE display will show



This display tells you that the TRANSPOSE value is now 0, meaning that the keyboard is in its regular key.

#### 2. Adjust the key with the VALUE buttons.

To raise the key, use +. Each value increase by 1 means an upward transposition by 1 semitone.

- lowers the key. A minus symbol "-" in front of the value indicates that the current key is lower than the regular setting of 0.

- Press both VALUE buttons simultaneously to instantly return to the regular key (TRANPOSE value 0).

#### Points to Remember

- The TRANPOSE value is memorized when power is turned off.
- The TRANPOSE value influences the pitch of transmitted MIDI note data and received data in the 00 mode. However, received data is not affected in the 99 mode. (See MIDI section.)

## TUNING [2]

Range: +/- 16

### Overview

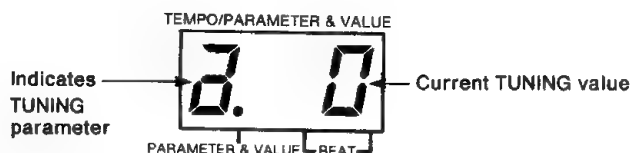
The overall pitch of your PortaSound is normally set so that A3 = 440 Hz (standard concert pitch). When playing together with other instruments which have a different tuning, you can raise or lower this pitch in steps of approximately 3.13 cents over a +/- 16 step range.

### Operation

1. Press TUNING [2].

The TEMPO/PARAMETER & VALUE display will show

TUNING Value Display



This display tells you that the TUNING value is now 0, meaning that A3 corresponds to 440 Hz.

2. Adjust the pitch with the VALUE buttons.

To raise the pitch, use +. Each value increase by 1 raises the pitch by about 3.13 cents.

- lowers the pitch. A minus symbol "-" in front of the value indicates that the current pitch is lower than the regular setting.

- Press both VALUE buttons simultaneously to instantly return to the regular pitch (TUNING value 0).
- The TUNING value is memorized when power is turned off.

## MELODY VOLUME [b]

Range: 1 - 9

### Overview

This parameter lets you adjust the volume of the keyboard's MELODY SECTION and the SONG MEMORY MELODY banks in relation to the AUTO ACCOMPANIMENT sounds. (For information on AUTO ACCOMPANIMENT, see below.) Minimum value is 1 for the quietest, maximum is 9 for the loudest sound.

Occasionally, chords will sound distorted if melody volume is set to maximum and the voice has a TOTAL LEVEL (see Digital Synthesizer section) of 90 or more. In such cases, lower the melody volume or the total level.

### Operation

1. Press MELODY VOL. [b].

The TEMPO/PARAMETER & VALUE display will show

MELODY VOLUME Value Display



This display tells you that the MELODY VOL. value is now 8 (the normal setting).

2. Adjust the melody volume with the VALUE buttons.  
+ raises the volume, - lowers it.

- To instantly return to MELODY VOLUME to value 8, press both VALUE buttons simultaneously.
- MELODY VOLUME setting is retained when power is turned off.

# RHYTHM MACHINE FUNCTIONS

A rhythm (or drum) machine provides a background of rhythm patterns played by various percussion instruments. This not only makes most popular music sound better, it also helps you keep perfect time, just like a metronome.

This section introduces the PortaSound's rhythm machine functions. Most of the following operations can be applied in exactly the same way for the AUTO ACCOMPANIMENT features explained further below, so it is a good idea to memorize them well.

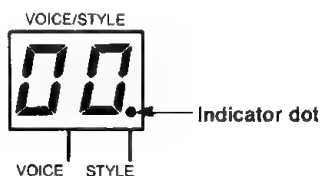
## STYLE SELECT — Choosing the Rhythm

### ■ Overview

The STYLE LIST (6b) shows the 100 basic rhythm styles at your disposal. Choosing one that suits your music is practically identical with selecting a voice — except that the STYLE indicator on the VOICE/STYLE display must be lit instead of the VOICE indicator.

### ■ Operation

1. Check whether the dot in the VOICE/STYLE number display (7) is located above "STYLE". If it is not, **press the yellow STYLE selector (5b).**



2. **Enter the style number.**

Use the VOICE/STYLE SELECT number buttons (5c) to input the number of the desired style.

As with voice numbers, all style numbers have two digits, so be sure to input enter both.

#### Points to Remember

- Which style is currently selected can be checked on the VOICE/STYLE display by pressing the STYLE selector. (This is not necessary if the indicator dot is already above STYLE.)
- When power is turned on, the style last selected is automatically chosen.
- The number of beats per rhythm pattern depends on the selected style. Many patterns consist of two measures with a slightly differing structure (see paragraph on BEAT Display below).
- If you wish, you can set the AUTO ACCOMPANIMENT MODE to NORMAL by pushing that button (3a) when using the PSS-480 like a rhythm machine. This will allow you to play the selected voice over the entire keyboard. (For details on AUTO ACCOMPANIMENT MODE, see p.17.)

## RHYTHM CONTROL

### ■ Overview

Now that you have selected a rhythm style, the RHYTHM CONTROL section (14) lets you start, change and stop the percussion in a variety of ways. This gives you incredibly flexible and realistic live control over the drum patterns. The five buttons are located above the center of the keyboard, making them easy to hit so you can operate them quickly without interrupting your keyboard playing.

With a bit of practice, you will be able to control the rhythm (and Auto Accompaniment) with these buttons as naturally as if you were a drummer — simply by pressing them at the right time.

### ■ Operation

#### Starting the Rhythm

- a) **START/STOP (14a)**  
Pressing this red button starts the rhythm right away.
- b) **SYNCHRO START/ENDING (14b)**  
When this gray button is pressed, both BEAT indicator dots in the TEMPO/PARAMETER & VALUE display start to blink simultaneously, indicating the tempo, but the rhythm does not start yet.  
In NORMAL mode, the rhythm will start as soon as you play any key(s) on the keyboard. In SINGLE FINGER and FINGERED, you can start the rhythm by pressing keys in the AUTO ACCOMPANIMENT SECTION.

#### Points to Remember

- The Synchro Start function can be canceled prior to rhythm start by pressing SYNCHRO START/ ENDING again.
- When using Synchro Start, you can watch the blinking indicator dots to get a feel for the beat until you are ready to start performing.
- Instead of playing a key, you can also start the rhythm by pressing START/STOP (14a).



c) **INTRO/FILL IN 1, 2, 3 (14c)**

These three yellow buttons in the right part of the RHYTHM CONTROL section start the rhythm right away with a special "INTRO" (introduction) pattern. (No other Auto Accompaniment instrument sounds are heard during the intro even if an AUTO ACCOMPANIMENT SECTION key is being pressed.) When the intro is finished (after one measure), the PortaSound continues with the basic rhythm.

The three intros available for each pattern are all different. However, with some of the simplest styles, the difference is not as pronounced as with the more complex ones.

### Stopping the Rhythm

a) **START/STOP (14a)**

Pressing this red button again stops the rhythm immediately.

b) **SYNCHRO START/ENDING (14b)**

Press this button when you want the rhythm to end naturally on a special "ending pattern".

#### Points to Remember

- Unless SYNCHRO START/ENDING is pressed within the first quarter beat of a measure, this ending pattern will begin only after the current measure has been played to the end.
- If an INTRO/FILL IN button is pressed during an ending, the ending rhythm pattern is replaced by a fill in percussion, and the Auto Accompaniment then continues with the basic pattern from the beginning of the next measure. In other words, the ending no longer ends the accompaniment. This can be very effective as a "break" within a song to add tension.

### Rhythm Variation

a) **INTRO/FILL IN 1, 2, 3 (14c)**

When pressed while a rhythm is playing, the three INTRO/FILL IN buttons start a special "fill in" pattern that livens up the rhythm by adding variation. Fill ins are particularly effective at the end of a phrase or during a musical climax.

As soon as the fill in is over, the PortaSound continues with the basic rhythm. Regardless of when an INTRO/FILL IN button is pressed, the fill in always "fits in" perfectly with the rhythm.

You can therefore get even more variation out of the rhythm by pressing INTRO/FILL IN buttons with different timings for different fill in effects.

The three fill ins available for each pattern are the same as the respective intros.

#### Points to Remember

- You can press another INTRO/FILL IN button while one fill in is playing to alter the fill in pattern. By continuing to press INTRO/FILL IN buttons alternately before the fill in is over, you can create complex drum solos over several measures.
- Holding down the same INTRO/FILL IN button causes that fill in to be repeated until the key is released.
- The intros/fill ins of all patterns, including those with a length of two measures, always have a length of one measure.

### TEMPO

**Range: 10 — 220**

As the name says, the TEMPO/PARAMETER & VALUE display not only indicates parameters and values (as explained in the PARAMETER CHANGE paragraph above), but also the tempo (i.e. the speed of the rhythm). The PARAMETER & VALUE indicator dot always tells you which of these two display types is currently set — if this dot is not lit, the display is showing the present tempo.

To switch to TEMPO display from any other kind of parameter indication, simply press the TEMPO button (10a).

Each rhythm has a "standard tempo" most suitable for its style. If you select a style while the rhythm is stopped, the PortaSound will automatically switch to this respective standard tempo (and display it if the TEMPO display is on). However, if you change styles while the rhythm accompaniment is playing, the PortaSound will continue in the present tempo. You can still instantly switch to the current style's standard tempo any time during a performance by pressing the VALUE — and + buttons (12) simultaneously.

Of course, you can easily adjust the tempo to your individual performance needs. Simply lower or raise the tempo with the VALUE — and + buttons during TEMPO display. (Pressing them at the same time returns you to the original tempo.)

The TEMPO control range is from  $\text{♩} = 10$  to 220 (i.e. 10 to 220 quarter notes / beats per minute). When power is turned on, the value of the last tempo adjustment made is automatically selected.

### BEAT Display

The two dot indicators of the BEAT display give you important information on the current rhythm pattern.

When both are blinking simultaneously while no sound is heard, this shows you are currently in SYNCHRO START standby (see above). Otherwise, the BEAT indicators light up only when a rhythm is playing.

- To indicate the beginning of a pattern, the left BEAT indicator dot lights up together with the right dot.
- Most of the patterns consist of two measures. To indicate the beginning of the second measure, the left BEAT indicator lights up alone.

- c) The right BEAT dot lights up alone to show the second, third, etc. beat of each measure. (Only at the beginning of a pattern does it light together with the left dot.)

## Changing the Rhythm Style During a Performance

When you want to switch to a different rhythm style while playing, simply enter the desired style number with the VOICE/STYLE SELECT buttons.

### Points to Remember

- The PortaSound will switch to the new rhythm style at the beginning of the next measure, retaining the current tempo. However, if the style number is altered within the first quarter of a beat, the PortaSound will switch styles during the same beat. (See the paragraph on Single Finger Auto Accompaniment, p.17, for a more detailed explanation.)
- In the case of rhythm patterns consisting of two measures, the order of these measures is maintained when styles are switched. In other words, changing the style after the first measure of a two-measure pattern has been played causes the PortaSound to continue with the second measure of the new style.
- No style change is possible during an ending.

## PERCUSSION Section

The PERCUSSION Section of the PSS-480 allows you play your own rhythm patterns live or record and memorize an original pattern. It consists of the PERCUSSION buttons (15a, b), the PERCUSSION keys (15) and the CUSTOM DRUMMER (explained below).

When the indicator of the green PERCUSSION ON/OFF (15a) switch is ON, the PERCUSSION keys can be played solo along with a melody, Single Finger Chords or Auto Bass Chords, or even during the demonstration song. This allows you to add your own variations to the the current rhythm pattern or perform your own drum solos. Depending on the SYNCHRO BREAK setting, you can either play "on top of" the present rhythm or have that rhythm stop automatically while you are pressing the PERCUSSION keys.

### Damping the Open Hi-Hat

Drummers can damp the sound of the open hi-hat by stepping on the hi-hat pedal. With the PSS-480, you can achieve a similar effect by pressing the closed hi-hat key soon after pressing the open hi-hat key. As soon as the closed hi-hat key is pressed, the open hi-hat sound is damped.

## SYNCHRO BREAK

When the red indicator of this switch is lit, the SYNCHRO BREAK function is on. In this mode, the regular rhythm accompaniment (basic pattern, intro, fill in or ending) will stop as soon as you press one or more of the PERCUSSION keys. You can thus add your own fill in patterns, solos, etc. The BEAT indicator dots still show the beat for visual confirmation of the tempo. The regular rhythm will continue automatically from the beginning of the following measure after you have completed your hand percussion part.

### Note:

If you press the button at the beginning of a measure while the rhythm is playing, Synchro Break will become effective. However, in order to enable a more natural fill in, it will not work when a button is pressed at the beginning of the measure following such a Synchro Break measure.

To turn off SYNCHRO BREAK, press its button, making sure the indicator goes out. With SYNCHRO BREAK off, you can play your own percussion "over" the regular rhythm, adding variety to the usual patterns.

- The maximum number of percussion sounds the PortaSound PSS-480 can produce at the same time is 8, including both regular rhythm and percussion key sounds. If more than 8 percussion instruments are played simultaneously, the PortaSound automatically gives priority to certain instruments while ignoring others.

## CUSTOM DRUMMER

### ■ Overview

With the CUSTOM DRUMMER (16) function, you can alter any basic rhythm pattern (but not fill ins or endings) to suit your music and memorize it for instant recall. Or else, you can create you own unique pattern from scratch and save it. The three white keys furthest on the left are labeled CLEAR, ACCENT and ROLL. They are used together with the PERCUSSION keys to erase (clear) certain instrument sounds from a pattern, add an accent to a sound (increasing its volume) or create rapid drum rolls.

To program your custom pattern, first select the style that will form its basis. Even if you want to create a totally new pattern, select the corresponding type of style — i.e., a one- or two- measure pattern, one in common time or three-four time, and so on. It is important to choose the right type. If you select a pattern consisting of a single measure as basis, you cannot create a two-measure pattern. If you choose a three-four time style, you will not be able to create a four-four time custom pattern.

Also note that some swing patterns, such as style 30 "Swing guitar", give the impression of using triplets, while actually they do not. To create a swing triplet rhythm, therefore be sure to use styles such as "Big Band 3".

## ■ Operation

### Recording a Custom Pattern

#### 1. Press PROGRAM/END.

This red button's indicator lights and the selected rhythm starts. (It is not possible to use PROGRAM/END while a rhythm is already playing or in synchro standby mode.) As soon as you press the PROGRAM/END switch, a muted closed hi-hat will automatically sound on every beat, in addition to a rimshot at the beginning of each measure.

This indicates the tempo and helps you keep time. (These muted hi-hat and rim shot sounds are NOT recorded.)

#### 2. Alter the rhythm as desired.

You can now make any changes you want (explained below) while the selected rhythm is repeated again and again. It is not necessary to play your entire pattern at once — take your time adding single notes and accents or deleting certain instruments as the pattern repeats, until you finally arrive at the complete pattern you intended. The following procedures let you program your own rhythm pattern:

##### a) Erasing Percussion Sounds

This is done by holding down the CLEAR key (C1) while pressing the key of the instrument to be erased. This deletes that instrument from the pattern completely. (It is not possible to erase single notes while retaining others.)

##### b) Adding Percussion Sounds

Every note you play by pressing a PERCUSSION key is recorded. When the pattern is repeated, you will hear the notes you added during the previous cycle.

##### c) Adding Accents

To enter an accented note, hold down the ACCENT key (D1) and press the desired PERCUSSION key. Accents can also be added later to existing notes by holding the ACCENT key down and playing the respective key at the precise timing of the note you want to sound louder. (You can delete accents in the same way without holding the ACCENT key down.)

#### d) Playing Drum Rolls

On actual percussion instruments, rolls are played by hitting the drum very fast with both sticks or letting one stick rebound. Since this is practically impossible with the PERCUSSION keys, the ROLL feature allows you to add such rolls by holding down the ROLL key (E1) while pressing a PERCUSSION key.

By pressing ROLL and ACCENT at the same time, you can create loud rolls.

#### e) Damping the Open Hi-Hat

When programming the custom pattern, you can damp the sound of open hi-hat notes by pressing the closed hi-hat key with the appropriate timing (slightly after the open hi-hat notes).

#### 3. Press PROGRAM/END again to memorize the rhythm.

As soon as you have completed your custom rhythm pattern, press PROGRAM/END. This stops the rhythm and stores the pattern in the CUSTOM DRUMMER memory. (You can do the same by pressing START/STOP, DEMONSTRATION, or turning off the PortaSound.)

#### Points to Remember

- If you want to continue editing (changing) the custom pattern you have already stored, press PLAY ON/OFF and then PROGRAM/END (both indicators must be lit). You can now alter the custom pattern.
- Switching to a different style while programming a custom pattern is not possible.
- Custom data is retained when power is turned off.
- While programming, none of the keys works (except the PERCUSSION keys and the three for CLEAR, ACCENT, and ROLL). Only VALUE (tempo) buttons are operative.

### Playing the Custom Pattern

To be able to play the custom pattern, the green PLAY ON/OFF button must be set to on, i.e. its red indicator must be lit. You can then start the custom pattern as you would a regular rhythm, by pressing START/STOP, SYNCHRO START or an INTRO. Remember, though, that intros, fill ins and endings will be those of the regular rhythm currently selected.

#### **Points to Remember**

- The custom pattern will be repeated as long as the **PLAY ON/OFF** indicator is lit. This means that selecting a different style will **NOT** automatically switch to that rhythm as is the case with regular rhythm patterns. Instead, you have to press the **PLAY ON/OFF** button again, turning off its indicator.
- Pressing **PLAY ON/OFF** to light its indicator while any regular pattern (not including fill ins or endings) is playing immediately starts the custom pattern, while pressing this button again immediately stops it and causes the selected style to continue. The tempo remains the same throughout. You can thus create and use a custom pattern as a special kind of fill in as well.  
If **PLAY ON/OFF** is pressed while a fill in is playing, the custom pattern will start after the fill in is over.
- When a custom pattern is played during a regular rhythm that is longer or shorter (has more or fewer beats) than the custom pattern, it is either cut short (in case of shorter patterns) or repeated (in case of longer ones) to fit in.

# AUTO ACCOMPANIMENT FEATURES

There are several basic types of AUTO ACCOMPANIMENT features available on the PSS-480. An outline of their functions is given here, along with an explanation of the MODE (3a) and ORCHESTRATION (3b) controls. A detailed operation guide for features A) through E) follows below.

- A) The **Single Finger Chord** function lets you play entire chords with just one finger.
- B) If you start a rhythm, the PortaSound will then also play percussion, bass, chords and orchestra parts that match each other perfectly, giving you truly **Automatic Single Finger Accompaniment**.
- C) For even more control over the harmonic structure of the AUTO ACCOMPANIMENT, you can play your own complex chords with **Fingered Automatic Accompaniment**. This feature is recommended for experienced keyboardists with a basic knowledge of harmony.
- D) In addition to the above accompaniments, **Duet** lets the PortaSound automatically perform a second solo voice that harmonizes with the one you are playing in the MELODY SECTION.
- E) Difficult chord progressions or melody phrases can be stored in the **Song Memory** banks for instant recall. The CHORD memories make Auto Accompaniment completely automatic.

- Except for Song Memory, these features are selected and/or started with the MODE (3a) and RHYTHM CONTROL (14) buttons, and controlled live by the AUTO ACCOMPANIMENT SECTION (18). This part of the keyboard has a different sound than the MELODY SECTION (19) to its right when AUTO ACCOMPANIMENT is turned on: The MELODY SECTION plays the selected VOICE, while the instruments sounds of the AUTO ACCOMPANIMENT SECTION (bass, chords and orchestra) depend on the selected STYLE.

## MODE

Three different AUTO ACCOMPANIMENT modes can be chosen with these selector switches. A red indicator shows which one is currently selected.

**NORMAL:** No Auto Accompaniment at all — the entire keyboard may be used to play the selected voice (12 voice polyphonic). All Rhythm Machine functions work in this mode.

**SINGLE FINGER:** When SINGLE FINGER MODE is selected, one, two or three fingers enable you to play complete chords or accompaniments in the AUTO ACCOMPANIMENT SECTION (18). You have the option of performing Single Finger Chords (no rhythm accompaniment) or Single Finger Auto Accompaniment (with automatic bass, rhythm, chord and orchestra instruments), depending on whether you switch on the rhythm or not.

**FINGERED:** This mode is similar to the preceding one, except that you must press at least three keys in the AUTO ACCOMPANIMENT SECTION to get any sound at all.

## ORCHESTRATION

These four switches determine the orchestration of the accompaniment, i.e. which instruments are used to play along with your melody (either as Single Finger Chords or Auto Accompaniment). Note that each style has its own basic orchestration with different kinds of instruments.

### 1) RHYTHM

Turns the percussion sounds on and off. Allows you to play Auto Accompaniment without any rhythm for music that sounds better without drums.

### 2) BASS

Switches the bass sound on and off. Various kinds of bass instruments are used for different styles - wood bass, tuba, electric bass, slap bass, etc.

### 3) CHORD

Each style uses different instruments for the CHORD part of the accompaniment — such as organ, piano, guitar, etc. — which can be turned on or off with this button. Chords consist of up to three notes sounding at the same time.

### 4) ORCHESTRA

A wide variety of instruments (up to three different ones for each style) is used for the ORCHESTRA accompaniment. This button turns it on or off. The orchestra accompaniment consists of three parts.

#### Points to Remember

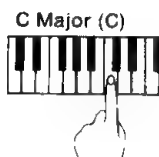
- The total number of notes you can play on the PortaSound PSS-480 at the same time is 12. Since the AUTO ACCOMPANIMENT features use up from 1 to 7 notes, (1 for bass, 3 for chords and 3 for orchestra), depending on the ORCHESTRATION setting, they limit the number of notes that may be played in the melody section to between 5 and 11.
- Single Finger and Fingered Chords consist only of BASS and CHORD sounds. Therefore, only the BASS and CHORD settings are relevant for these functions.
- If all ORCHESTRATION buttons are off, no sound will be heard when playing the AUTO ACCOMPANIMENT section of the keyboard, but chord assignment is still operative for DUET and SONG MEMORY (see below).

## A) Single Finger Chords

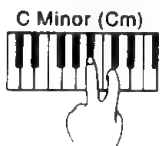
Press the AUTO ACCOMPANIMENT SINGLE FINGER MODE selector (3a) to turn on the Single Finger mode. (The rhythm must be off.) Now play single keys in the AUTO ACCOMPANIMENT SECTION (18) of the keyboard with one finger and notice how the PortaSound produces complete major chords instead of just single notes.

In the Single Finger mode, the PortaSound PSS-480 can play the following four different types of chords, depending on the key combinations you press in the AUTO ACCOMPANIMENT SECTION (18).

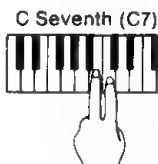
**MAJOR CHORDS:** To obtain a certain major chord, all you have to do is press the key corresponding to its basic note. For example, if you want to hear a C major chord, press C.



**MINOR CHORDS:** Minor chords are produced by pressing the basic note together with any black key to the left of it. The illustration below shows how to play a C minor chord.



**SEVENTH CHORDS:** To obtain a seventh chord, press the basic note along with any white key to its left.



**MINOR SEVENTH CHORDS:** Minor seventh chords are produced by pressing the basic note together with any black key AND white key to the left of it.

C Minor Seventh (Cm7)



### Note:

In general, you should release the keys completely, lifting you fingers off the keyboard, to change to a different chord with the Single Finger Chord function. Otherwise, you may not be able to obtain the intended type of chord. For example, if you want to change from G major to A major and do not release the G key completely before pressing A, you will get an A seventh chord instead of the A major chord you wanted.

On the other hand, you can for example change from a major to a minor chord while pressing the basic note by additionally playing any black key to the left. This gives a different effect than you would achieve by releasing the basic key. (Of course, this way of altering chords will not work when switching to chords using fewer keys than the current chord, say from C minor seventh to C seventh.)

**TIP:** The PortaSound PSS-480 plays Single Finger Chords with a large variety of different instruments, depending on the currently selected style. This allows you to choose the best kind of accompaniment voices for the music you want to play.

To see how important it is to choose the right kind of voice and accompaniment sounds, try playing Mendelssohn's famous "Wedding March", following the score below.

First, select a suitable voice, e.g. number 29 (SMALL CHURCH organ) or 16 (TROMBONE), then a style that fits in with it. For example, style 03 (GOSPEL) gives an organ accompaniment, while MARCH 1 and 2 (77, 78) provide brass sections.

Next, turn on the Single Finger Chord function by pressing SINGLE FINGER. You can now perform the "Wedding March" by playing the melody with your right hand and the chords indicated above the score with your left.

(Remember: "Am" means an A minor chord, "B7" a B seventh chord, and so on.)



Other interesting voices you may want to try for this march are numbers 28 (TREMOLO ORGAN), 11 (CELLO) and 95 (HUMAN VOICE 2). In any case, you will notice that the selection of a suitable voice and style is very important to bring out the atmosphere of a piece.

**Note:**

Basically, all of the steps explained for the Rhythm Section further above — concerning style selection, RHYTHM CONTROL, etc. — can also be used to operate the AUTO ACCOMPANIMENT features introduced here.

## **B) Single Finger Auto Accompaniment**

Using the same simple key combinations as explained above — for major, minor, seventh and minor seventh chords — you can have the PortaSound play complex accompaniment combinations complete with bass and orchestra. All you have to do is start the selected rhythm in either of the following ways, making sure that SINGLE FINGER MODE is selected:

### **Starting the Accompaniment**

a) **Press SYNCHRO START/ENDING**

The BEAT indicators will flash in the selected tempo, and you can now start the entire single finger chord accompaniment at once by playing any key(s) in the AUTO ACCOMPANIMENT SECTION.

b) **Start the rhythm with START/STOP or an INTRO/FILL IN button.**

Any key now pressed in the AUTO ACCOMPANIMENT SECTION starts the other accompaniment parts — bass, chords and orchestra.

You can begin playing any time you want, either after a few beats or measures of percussion sounds, or right from the start (except during an intro), depending on the musical effect you want.

### **Points to Remember**

- Auto accompaniment will continue automatically even if you lift your fingers off the keyboard. The key and the pattern of the arrangement (bass line, chord structure, orchestra part) is determined by the keys played in the AUTO ACCOMPANIMENT SECTION. Just as you changed chords with the Single Finger Chord function, you can now alter the entire accompaniment by playing different keys or key combinations. Further variations can be added by pressing the INTRO/FILL IN or ENDING buttons as explained under RHYTHM CONTROL (p.12).
- Since the accompaniment arrangements are based on the respective rhythm pattern, their length (number of beats/measures) depends on the style.

## **About the Auto Accompaniment Patterns**

To create the desired chord progression with the accompaniment, all you have to do is play different keys in the AUTO ACCOMPANIMENT SECTION. As a rule, the structure of the accompaniment pattern will always change on the following beat AFTER you play different keys — regardless of the precise timing with which they were played. Musically, this gives the most natural effect.

However, to make sure that the chord progression is performed as intended even if you are slightly late playing the new keys, the PortaSound will switch the pattern structure during the same beat if you change the chord soon enough. When you press a different Single Finger or Fingered Chord during a pattern, the PortaSound does not simply go on playing the accompaniment as if nothing had happened, as this would sound unnatural. Instead, the PSS-480 automatically alters the accompaniment pattern somewhat, adding variety and giving a very natural, musical effect.

Once you get to know the various styles and their pattern arrangements, you can make use of this computer-controlled feature for an even more varied accompaniment.

### **Stopping the Accompaniment**

To stop the accompaniment, you have two options:

a) **Press START/STOP.**

This will stop the entire auto accompaniment immediately.

b) **Press SYNCHRO START/ENDING.**

The PortaSound will play the ending arrangement for the selected style, and the accompaniment will stop in a very natural way.

### **Changing Tempo and Style**

As explained for the rhythm functions on p.12, you can alter the tempo and switch the style while an auto accompaniment is playing as well.

## **C) Fingered Auto Accompaniment**

This mode works practically the same way as Single Finger Auto Accompaniment, except that it requires you to play the AUTO ACCOMPANIMENT SECTION of the keyboard in a different manner, closer to the actual chord structure used for the automatic accompaniment.

In the FINGERED Auto Accompaniment mode, you have to play three- or four-note chords for the PortaSound to be able to accompany you. The PSS-480 recognizes the following chord types:

Major:

1 — 3 — 5

Minor:

1 — 3 $\flat$  — 5

Seventh:

1 — 3 — 5 — 7 $\flat$  or 1 — 3 — 7 $\sharp$



**Minor seventh:**

1 — 3<sub>b</sub> — 5 — 7<sub>b</sub> or 1 — 3<sub>b</sub> — 7<sub>b</sub>

**Major seventh:**

1 — 3 — 5 — 7 or 1 — 3 — 7

**Minor seventh flattened fifth:**

1 — 3<sub>b</sub> — 5<sub>b</sub> — 7<sub>b</sub>

**Seventh sustained fourth:**

1 — 4 — 5 — 7<sub>b</sub> or 1 — 4 — 5

**Augmented:**

1 — 3 — 5<sup>#</sup>

**Diminished:**

1 — 3<sub>b</sub> — 5<sub>b</sub> — 6 or 1 — 3<sub>b</sub> — 5<sub>b</sub>

**Minor major seventh:**

1 — 3<sub>b</sub> — 5 — 7 or 1 — 3<sub>b</sub> — 7

**Sixth:**

1 — 3 — 5 — 6

**Minor sixth:**

1 — 3<sub>b</sub> — 5 — 6

**Seventh flattened fifth:**

1 — 3 — 5<sub>b</sub> — 7<sub>b</sub>

**Points to Remember**

- The inverted forms of chords (in the case of a major chord for instance 3—5—1 and 5—1—3, etc.) are also recognized.
- Any combination of notes other than those listed above is ignored.
- In the case of augmented and diminished chords, the lowest note played on the keyboard is considered to be the root of the chord.
- Sixth chords are distinguished from minor sevenths as follows: If the lowest key played is the root of the sixth, the PortaSound considers the chord to be a sixth chord, while all other key combinations produce minor sevenths.
- In a similar manner, minor seventh flattened fifth chords are distinguished from minor sixths according to whether the lowest note played is the root of the sixth (in which case the chord is considered a minor sixth) or not.
- With seventh flattened fifth chords, the lowest key played is treated either as the root or the seventh.

## DUET

### ■ Overview

By using the Duet feature, you can have the PortaSound automatically perform a second voice that harmonizes perfectly with any solo part you play in the MELODY SECTION of the keyboard. This gives the impression of a duet (a performance with two instrument parts), even though you are playing only one part yourself.

To be able to use Duet, the PortaSound must be set to one of the AUTO ACCOMPANIMENT modes (Single Finger or Fingered).

### ■ Operation

1. **Select SINGLE FINGER or FINGERED mode (3a).**
2. **Press the DUET button (8).**  
Its red indicator will light up. The PortaSound is now ready to perform an automatic Duet.
3. **Start Auto Accompaniment or play Single Finger Chords.**  
Once an Auto Accompaniment is playing (or a Single Finger Chord is pressed), any melody lines you perform with your right hand will automatically be accompanied by a second voice in harmony with the accompaniment. (The sound of this second voice is that of the currently selected instrument.)

### — Points to Remember —

- With the Duet function on, the MELODY SECTION is monophonic — only one note can be played at a time. If more than one key is pressed simultaneously, only the highest one will sound.
- Portamento can be used with Duet.
- Duet has no effect on SONG MEMORY MELODY playback.
- The Duet sound data is all output on the same MIDI OUT channel.
- Duet works even if the entire Auto Accompaniment ORCHESTRATION is turned off. This lets you play a duet without any accompaniment sounds.
- Duet is canceled if a melody memory is turned on for recording.

# SONG MEMORY

The SONG MEMORY section (17) comprises ten memory banks in which you can digitally record melodies and chord progressions for instant automatic playback. Difficult (fast) or complicated passages can be memorized at a comfortable low speed and played any time with the correct tempo at the touch of a button, making perfect performances easier than ever.

The SONG MEMORY consists of five MELODY (17b) and five CHORD (17a) banks, which are treated here separately.

- The MELODY and CHORD memory functions can be used to record simultaneously when you want to memorize melodies complete with accompaniment. (The CHORD memory will thereby store the timing with which MELODY banks were turned on or off.)

## MELODY Memory

The five MELODY banks are all monophonic. This means you can only store melodies where one note is played at a time (i.e. melodies not containing chords) in any of these memories. However, you can use several MELODY banks together to memorize polyphonic passages with a maximum of five voices. Each bank can store up to about 250 melody notes.

### Memorized Data

The MELODY SONG MEMORY not only memorizes note data, but also voice numbers and effects. In other words, you can change voices during a recorded performance and switch VIBRATO, SUSTAIN, REVERB and/or PORTAMENTO on or off — and the PortaSound will remember all of this. When you play back the melody, the voices and effects will change with the correct timing.

In addition, the current values for melody volume and portamento speed, are automatically stored for each bank at the beginning of a recording. During playback, the PortaSound operates according to these settings.

- You can use the entire keyboard for melody recording if the AUTO ACCOMPANIMENT MODE is set to NORMAL (3a). Otherwise, only the MELODY SECTION may be played.
- During MELODY MEMORY playback, you can use any of the Auto Accompaniment functions as usual and, in addition, play along "live".

How many notes you can play live depends on the number of voices being reproduced by the MELODY MEMORY and the orchestration of the AUTO ACCOMPANIMENT. If a full bass, chord and orchestra accompaniment is playing (= 7 voices) and you are reproducing all five MELODY MEMORY banks, this leaves no additional live voice as the PortaSound can play a maximum of 12 notes simultaneously. (See the paragraph on ORCHESTRATION.)

### How to Memorize a Melody

- When you begin, the rhythm must be stopped (off) to be able to use the MELODY memory. Once you start recording, though, the currently selected rhythm will start by itself, helping you to keep time. Therefore, be sure to select the right style for the melody you wish to memorize, and adjust the tempo before starting to record.

### ■ Operation

1. **While holding down the red RECORD button (17c), press the MELODY bank selector for the memory you want to store your melody in.**

Should you wish to memorize a polyphonic melody, press as many MELODY selectors as you need to accommodate all the voices. For example, if the melody contains triads (three-note chords), you have to select three memory banks while holding down RECORD.

The red LED indicator(s) of the MEMORY selector(s) you pressed will start to flash with alternating long/short intervals, showing that the selected memory is on standby, ready for recording. To turn off a memory if you decide to use a different one instead, simply press its selector again.

Also note that the BEAT indicators in the TEMPO/PARAMETER & VALUE display begin to blink, indicating the tempo.

2. **Start playing the melody.**

This automatically starts the rhythm and recording. During the recording, the LED(s) of the respective bank(s) will blink rapidly.

Instead of beginning to play right away, you can press the RHYTHM CONTROL START/STOP button or use a FILL IN if you want the melody to start with a pause. (The interval between starting the rhythm and playing the first note on the keyboard is memorized.)

3. **Press START/STOP to end the recording.**

As soon as you do, the melody performance is stored and remains so even if power is turned off. The number indicator(s) of the bank(s) in which the data is stored will go out.

#### Points to Remember

- If several MELODY banks have been recorded simultaneously, they are treated as one "set". In other words, they can only be played back together. As soon as any of the memory selectors of such a set is pressed for playback, the LED indicators of the other selectors in this set will also light up, showing that they belong together.
- Starting to record will erase any data currently stored in the selected MELODY bank(s). If the selected bank belongs to a "set" as mentioned above, this entire set is deleted.
- Any of the five DIGITAL SYNTHESIZER banks can also be used as a voice source during MELODY recording. Note, however, that later editing (alteration) of the digital synthesizer voice will of course change the corresponding voice as played by the MELODY bank.
- The current effect settings (vibrato, sustain, reverb and portamento) are memorized at the beginning of a recording and can be changed any time while you record.
- After a recording has been completed, you can alter the melody volume, portamento speed and MIDI transmission channel by entering record standby (step 1. above), changing the setting, then exiting record standby by pressing the respective MELODY button again.

#### Points to Remember

- Even while a MELODY bank is playing, you can start any other MELODY bank by pressing its selector. (Again, playback of such banks will begin from the following measure.)
- If identical melodies are recorded with identical voices in different banks and played back simultaneously, a phase cancellation effect may occur, causing the melody sound to decrease. Therefore, avoid such unison recordings.
- Playback continues until the end of the melody, where it will stop and the selector's indicator go out. Playback can be stopped any time by pressing the respective MELODY bank selector again.
- Pressing the MELODY selector of a bank containing no recorded data will have no effect.

#### Simultaneous Recording and Playback

It is possible to record one or several MELODY banks while playing back (and thus listening to) others you have previously recorded. This is very helpful when you want to perform one melody part "on top of" another one, making sure they fit together.

Operation is a simple combination of the recording and playback steps described above:

1. **While holding down the RECORD button, press the MELODY bank selector(s) for the memory you want to store the new melody in.**

The red LED indicator(s) of the MEMORY selector(s) you pressed will start to flash with alternating long/short intervals, showing they are ready for recording. The BEAT indicators in the TEMPO/PARAMETER & VALUE display begin to blink.

2. **Press the selector(s) of the MELODY bank(s) you wish to play back.**

The selector's indicator will start to blink slowly.

3. **Start playing the new melody.**

This automatically starts recording. As soon as the recording begins, the LED(s) of the recording MELODY bank(s) will blink rapidly, while those of the playback banks will stop flashing and instead remain lit.

4. **Press START/STOP to end the recording.**

- You can stop playback of any bank(s) during the recording by pressing the respective selector(s).

#### Melody Playback

Starting melody playback is slightly different according to whether the rhythm is currently playing or not.

##### If no rhythm is playing —

1. **Press the desired MELODY bank selector(s).**

The selector's indicator will start to blink slowly, and the BEAT indicators will flash in the selected tempo. This shows that the PortaSound is now on standby for synchronized melody playback.

2. **Play a key in the AUTO ACCOMPANIMENT SECTION to begin playback.**

If the PortaSound is set to NORMAL Auto Accompaniment mode, pressing any key will start playback. Otherwise, play keys in the AUTO ACCOMPANIMENT SECTION. Playback may also be started with START/STOP or an INTRO/FILL IN button.

As soon as playback begins, the respective MELODY indicator(s) will stop flashing and remain lit.

##### If a rhythm is playing —

1. **Simply press the desired MELODY bank selector(s).**

The selector's indicator will start to blink slowly. Playback will commence from the beginning of the next measure following the one during which you pressed the selector. As soon as playback begins, the MELODY indicator(s) will stop flashing and remain lit.

## CHORD Memory

The CHORD memory is a highly sophisticated automatic performance feature that not only lets the PortaSound play programmed chord progressions and rhythm arrangements, but also memorized melodies and custom drum patterns with the desired timing.

The following kind of data can be stored in each CHORD memory bank. Note that the resolution differs according to the type of data. ("Resolution" means the maximum number of data changes the PortaSound will accept within a certain time. For example, a resolution of one beat for chords indicates that the PSS-480 reacts to one chord change per beat at most — more frequent changes are ignored.)

### CHORD Memory Data

- Auto Accompaniment Chords and chord change timing — resolution 1 beat
- INTRO/FILL IN number and start timing — resolution 1 beat
- ENDING start timing — resolution 1 measure
- On/off timing of MELODY MEMORY banks — resolution 1 measure (on), 1 beat (off)
- Timing of ORCHESTRATION changes — resolution 1 beat
- Style number and change timing — resolution 1 measure
- Custom drummer PLAY ON/OFF — resolution 1 beat
- 1 initial TEMPO setting per bank (any tempo changes made during a recording are not stored)

### How to Record with the CHORD Memory

1. While holding down the red RECORD button (17c), press the CHORD selector (17a) for the memory you want to store your data in.

The red LED indicator of the CHORD selector you pressed will start to flash with alternating long/short intervals, showing that the selected memory is standing by for recording. To turn off a memory, simply press its selector again.

The BEAT indicators in the TEMPO/PARAMETER & VALUE display begin to blink, indicating the tempo.

Since no chords can be memorized in the NORMAL AUTO ACCOMPANIMENT MODE, the PortaSound automatically selects the FINGERED MODE (its indicator lights). You can switch to SINGLE FINGER MODE (3a) instead if you prefer.

2. Start playing the AUTO ACCOMPANIMENT SECTION of the keyboard.

This automatically starts recording. The CHORD selector indicator flashes rapidly.

You can press the RHYTHM CONTROL START/STOP button or use a FILL IN instead if you want the chord progression to start with a pause. (The interval between starting the rhythm and playing the first chord is also memorized.)

When recording a melody at the same time (i.e. when one or more MELODY banks are also selected), you can start to record by playing any key on the keyboard. All data listed above is now recorded with the correct timing. For instance, you can turn MELODY memory playback on and off during the performance, and the PortaSound will memorize when you did. If you start recording a melody simultaneously with the chords, this melody will also be played when you later start CHORD memory playback.

3. Press START/STOP or ENDING to end the recording.

As soon as you do, the CHORD selector indicator goes out and the entire performance is stored. It remains so even if power is turned off.

- If the performance (chord progression) was stopped by pressing START/STOP, the entire progression will be played repeatedly during playback. On the other hand, if you stopped recording with an ENDING, it is played back only once. (Of course, if you pressed START/STOP or a FILL IN button before the ending was over, playback will repeat.)
- Starting to record will erase any data currently stored in the selected CHORD bank.
- A CHORD bank's tempo setting can be altered after a recording. Simply enter record standby (step 1. above), alter the tempo value, then press the respective CHORD memory bank button again.
- Since each CHORD bank can store a different tempo, you can use this feature to liven up your music by switching between slower and faster banks during a performance.

### CHORD Memory Playback

CHORD bank playback can be started any time, regardless of whether the rhythm is currently playing or not.

If no rhythm is playing —

1. Press the desired CHORD bank selector.

The selector's indicator will start to blink slowly, and the BEAT indicators flash in the currently selected tempo. The PortaSound is now on standby for synchronized playback. If you wish, you can also select a MELODY bank.

2. Press START/STOP.

Playback of the selected CHORD memory bank and any selected MELODY bank will commence.

Playback may also be started by playing keys — any key in NORMAL mode, and AUTO ACCOMPANIMENT SECTION keys in the other modes.

As soon as playback begins, the CHORD indicator will stop flashing and remain lit.

**If a rhythm is playing —**

**1. Press the desired CHORD bank selector.**

The selector's indicator will start to blink slowly.

Playback will commence from the beginning of the next measure following the one during which you pressed the selector.

As soon as playback begins, the CHORD indicator will stop flashing and remain lit.

The TEMPO will switch from the currently selected value to the tempo memorized in the CHORD bank.

- You can switch between CHORD memory banks during playback by pressing another CHORD selector. The chord progression and the tempo will change from the beginning of the following measure.
- For CHORD banks whose recording was ended with the START/STOP button, playback is repeated until you stop it with START/STOP or SYNCHRO START/ENDING and the selector's indicator goes out.
- Unlike the MELODY function, pressing the selector of a CHORD bank being played back does NOT stop playback. Instead, that bank will begin playing again from the start.  
To stop CHORD bank playback any time, press START/STOP.

**Points to Remember**

- If you change the tempo during CHORD bank record standby, and quit recording by pressing the chord bank button, this new value will be recorded for that bank.
- You can use the controls for the CHORD memory data listed above to alter a SONG MEMORY CHORD performance while it is being played back. For instance, you may use the INTRO/FILL IN button (14c) or SYNCHRO START/ENDING button (14b). (It is not possible to switch to a different style during CHORD MEMORY playback.) However, such operations are not memorized.

# PART III

## ADVANCED FUNCTIONS

### DIGITAL SYNTHESIZER

Like a Yamaha DX synthesizer, the PortaSound PSS-480 uses an FM sound source — and like a digital synthesizer, it lets you adjust various voice settings (parameters) in order to create your own original sounds. Five of these custom voices can be stored in special memory banks.

The following short basic course on "FM Synthesis" which will help you understand this process, making it easier for you to achieve the kind of sound you have in mind.

While this paragraph explains in detail how the voice parameters work together, their functions are summed up in the next section, **SYNTHESIZER PARAMETERS**, for easy reference. You may want to read that section first for a quick overview.

#### FM SYNTHESIS BASIC COURSE

##### 1) Voice Parameters and Values

The preset voices are edited (altered) by changing the values of nine voice parameters (selectors 11a). These settings determine what a voice sounds like by each adjusting a different aspect of the tone. The controls for the DIGITAL SYNTHESIZER section (11) are located under an illustration that shows how these parameters are interrelated, giving their names and numbers. It is reproduced further below for your convenience. (The small numbers next to the parameter numbers in the illustration are the respective value ranges of the parameters.)

How to alter parameter values has already been explained on p.10 in the **PARAMETER CHANGE** paragraph. Pressing the parameter selectors (11a) calls up the value of each parameter on the **TEMPO/PARAMETER & VALUE** display (13). The single digit left of the dot on the display indicates the **PARAMETER** number/symbol. The two digit number to the right of the dot is the current **VALUE** of that parameter.

- The only difference to note here is that the parameter selectors in the left row access two parameters each. This is indicated by their having two numbers (e.g. 0/1) printed on them. Repeatedly pressing any of these three selectors switches between the two parameters shown on the selector you pushed. The parameter number on the display will alternate accordingly.

Once a parameter is called up on the display, you can change its value with the **-** and **+** **VALUE** buttons (12).

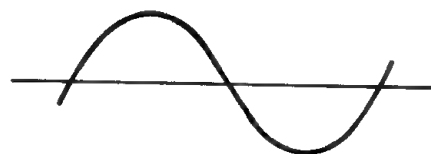
The following explains how the parameters influence the instrument sound. While reading this information, you will be making various settings so you can actually hear how a voice is created step by step.

##### 2) A Bit of FM Theory

###### a) Modulation

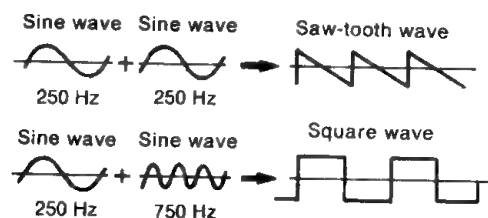
Select voice 99, the **SINE WAVE**. Play the keyboard and listen to the tone. Press a single note, and it sounds like an electronic signal. Play a chord, and it is more similar to a cheap electric organ.

As the voice name says, this is the sound of a pure sine wave. It is the shape of such waves that determines the character of a sound — a violin and clarinet sound different because they produce a different wave shape. A sine wave looks like this:



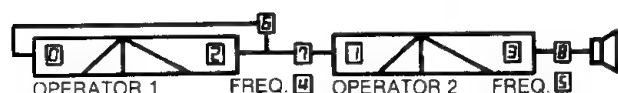
All FM sounds are based on such sine waves — one sine wave is used to modulate, or interact with, a second one, thus changing the sound quality. In fact, FM is short for "Frequency Modulation", which is the sine wave interaction method your PortaSound uses to produce all the realistic sounds you have already tried out.

Depending on the frequency ratio of the FM sine waves, the resulting wave form will differ. The following two examples show what happens when a sine wave with a frequency of 250 Hz modulates another sine wave of the same frequency (ratio 1:1), and when it modulates a 750 Hz sine wave (ratio 1:3).



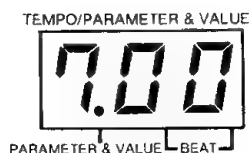
As you can see, the different ratios produce totally different wave forms - saw-tooth waves give a bright tone color suitable for strings and brass, while square waves sound milder and "simpler", having fewer harmonics (overtones), and are good for woodwinds like clarinet and oboe.

To generate the basic sine waves, the PSS-480 uses digital oscillators called "operators" in FM synthesis. The basic configuration of these operators is shown on the front panel illustration reproduced here.



The two white "boxes" (with the green triangles in them) represent the two oscillators, labeled as OPERATOR 1 and OPERATOR 2. The output from OPERATOR 1 is fed to the input of OPERATOR 2, thus modulating the second oscillator. As you have just seen, this causes it to oscillate in a different way, producing a different sound than the simple sine wave tone.

You can try out the effect of such modulation right away. At the moment, with the SINE WAVE voice, OPERATOR 1 is NOT modulating OPERATOR 2 at all - that is why you hear nothing by a sine wave in the first place. Check this by pressing the MODULATION LEVEL button in the DIGITAL SYNTHESIZER section. The TEMPO/PARAMETER & VALUE display will change to



As you can see, the MODULATION LEVEL parameter [7], which determines how strongly operator 1 modulates operator 2, is set to 00. This means there is no modulation in this voice - but you can change that. Raise MODULATION LEVEL by holding down the + VALUE button while playing the keyboard. Notice how the sound becomes brighter and sharper, particularly over a value of 50.

Finally, set MODULATION LEVEL to 80. Compare this sound to the original SINE WAVE voice by pressing - and + at the same time to revert to the original modulation level value of 00.

- Unless you store them in the memory banks BANK 1 - 5 (11b), your original sounds will be lost as soon as you switch to a different voice.

Set MODULATION LEVEL back to 80, then save this new voice to memory BANK 1. This makes it easier to compare the new voice with the original SINE WAVE sound.

- How to save voices to any of the five BANKS was explained on p.8 A TIP. Simply hold down the red STORE button (11c) and simultaneously press the desired BANK selector (11b), for example BANK 1. The VOICE/STYLE display will indicate "b.1". The voice you are currently working on is now stored in BANK 1 and can be recalled any time by pressing that button.

You can select SINE WAVE by entering "99" with the VOICE SELECT buttons, and the altered voice with BANK 1. When you switch between them, the TEMPO/PARAMETER & VALUE display shows their different MODULATION LEVEL value.

### b) Modulators, Carriers, Envelopes

Before you can use the rest of the parameters to create sounds, it is necessary to understand a bit more about FM Synthesis theory. Once you have got to know the concepts of "modulator", "carrier" and "envelope", you will hear how they actually determine the characteristics of each voice.

The left row of buttons - ATTACK RATE, DECAY RATE and FREQUENCY - accesses identical parameters for operators 1 and 2. However, due to their different roles in FM synthesis, the settings affecting operator 1 have a very different influence on the sound than those for operator 2. Since OPERATOR 1 modulates OPERATOR 2, it is called a "modulator". It is responsible for the tonal quality of a sound. OPERATOR 2 is referred to as a "carrier" because it "carries" the sound, determining its volume.

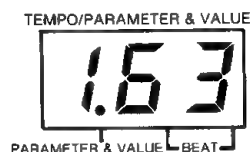
Within the two OPERATOR boxes is a green triangle called an "envelope" - a representation of the change in operator output level over time. It comprises of two parameters, ATTACK RATE and DECAY RATE. "Attack" is the time it takes for the level to rise from 0 to peak value, while "decay" is the opposite - how long it takes for the level to drop from its peak back to zero.

You can now listen to how all of this relates to actual sound synthesis while continuing to alter the sound you have stored in BANK 1.

## 3) Creating Sounds

### ATTACK RATES

To see how the attack works, call up parameter [1], i.e. the ATTACK RATE for OPERATOR 2, the carrier. The TEMPO/PARAMETER & VALUE display should show





The attack rate for the carrier envelope is set to its maximum value, 63. This means that the carrier level peaks immediately when a key is pressed. Now set the value to 01 and press any key, holding it down for several seconds. Notice how long it takes the volume to reach its peak.

The two things you can learn from this are:

- a) The higher the ATTACK RATE value, the faster the attack.
- b) The carrier (OPERATOR 2) level determines the volume of a sound.

Reset parameter [1] to the original value of 63 and switch to parameter [3], the ATTACK RATE for the modulator. Again, set it to 01 and press a key for several seconds. This time, the volume remains more or less the same, but the brightness of the sound increases with time. Lesson three therefore says:

- c) The modulator level influences the tonal quality of a sound.

If you set the modulator attack rate to around 22, you can achieve a kind of "wah" effect - try it. Store this new voice in BANK 2.

To verify that the modulator OPERATOR 1 is responsible for the tonal quality, set MODULATION LEVEL [7] back to 00. The sound is the same as the original SINE WAVE voice - even though operator 2 attack is set to 22, there is no longer any wah effect since there is no modulation.

## DECAY RATES

Recall the voice in BANK 1 by pressing that button. We will experiment with the DECAY RATES, starting with the one for the carrier - so call up parameter [3] on the display. Raise the value to around 25 and play some keys. What sounded like an organ until now has begun to sound like a clavinet, because

- d) the higher the DECAY RATE value, the faster the decay. In the case of the carrier, this means the sound will die out faster if you raise the decay rate. While a voice with a carrier decay rate of 00 will continue "for ever" (as long as you press a key), high values just produce a short click noise - the sound dies out so quickly that you do not perceive it as musical any longer. Try and see, then set the value back to around 25.

Now change the modulator decay, parameter [2], as well. As was to be expected, this alters the tone over time. Raise the value to around 30, and you will get an effect similar to plucked strings or a percussive instrument being hit by a mallet. Save this new voice to BANK 3.

By now, you will probably realize the great potential the PortaSound PSS-480 gives you for creating a wealth of instrument or fantasy sounds, using the voice parameters and your own imagination.

## FREQUENCIES

### Operator 2 Frequency - Parameter [5]

To understand the next parameters, FREQUENCY, again switch to the SINE WAVE voice 99 and call up parameter [5]. Its value is 1. With the PSS-480, this means the keyboard is set to the standard pitch where the frequency of A3 is 440Hz. Raising the value to 2 doubles the frequency, so all keys play an octave higher.

Since doubling the frequency of the carrier is the same as raising pitch by one octave, you have to increase the FREQUENCY value to 4 (NOT 3) when you want the sound to be higher by 2 octaves, to 8 for 3 octaves. By the same token, a value of 6 produces a pitch an octave above that of value 3, and an octave below that of 12. The only exception to this rule is the value 00, which gives a pitch one octave below the standard.

### Operator 1 Frequency - Parameter [4]

Though parameter [4] alters the frequency in exactly the same way, only for the modulator, the effect is very different. Remember that altering the ratio between the two sine waves of OPERATOR 1 and OPERATOR 2 results in different wave forms (p.25). This allows you to create various complex harmonic structures (and thus characteristic tones), which depend on the wave form.

Press BANK 3 and access parameter [4]. Raise the value to 7. The sound takes on a new quality, becoming "glassy". Store this voice in BANK 4.

Using the same method, you can also alter the BANK 1 sound. Call it up and raise its modulator frequency value (parameter [4]) to 3. Save this voice to BANK 5.

## FEEDBACK LEVEL

There is one more parameter that influences the characteristics of a sound: FEED BACK LEVEL. As you can see in the front panel illustration, OPERATOR 1 is half surrounded by a line that leads from its output to its input, marked [5]. This is a "feedback loop" where part of the operator 1 output is returned to the input, producing "self-modulation".

The effect is similar to, though often more extreme than what would happen if operator 1 were being modulated by another operator. In other words, increasing this feedback = self-modulation makes the sound brighter, sharper, etc., just like modulation of operator 2 through operator 1 does.

Call up the BANK 1 voice and raise its FEED BACK LEVEL. A setting of 6 produces a distortion or "fuzz" effect, a lower one of about 4 gives a harmonium-like quality to the original sound. Choose the setting you like and store the new voice in BANK 1 again, thus erasing the previous one.

## TOTAL LEVEL

Since MODULATION LEVEL was explained at the beginning, this leaves the simplest parameter of them all TOTAL LEVEL.

In the illustration, the output from OPERATOR 2 is connected to a loudspeaker symbol. This indicates that this parameter determines how loud voices will sound.

Adjusting it allows you to set the basic volume individually for each voice you create.

- Some voices will sound distorted if the TOTAL LEVEL is raised to over 90 especially when they are used with melody volume level 9. If this happens, lower the TOTAL LEVEL for that voice.

This completes the explanation of the DIGITAL SYNTHESIZER section. You will still need a bit of practice to be able to use it the way you want.

In the meantime, compare the five new voices in banks 1 to 5 with the original SINE WAVE sound. Notice how even the simple, basic settings you made have dramatically transformed the simple sound of voice 99 into something far more interesting. Also be sure to try out various EFFECTS — for example, BANK 4 and 5 sound nice with SUSTAIN and REVERB, BANK 1 with VIBRATO.

When saving edited sounds to the five BANKS, the current sustain and vibrato settings are also memorized.

The best way to learn more about sound creation is to have a look at the parameter settings used for the preset instrument voices. Calling up a certain parameter on the display and then switching between various voices lets you compare their specific values, giving you a better idea of how different settings influence the sound.

- Since the preset voices use other internal parameters besides the ones explained above (whose values cannot be altered) the results of your sound editing will depend on the voice you originally start out with. Even if the parameter settings you made are exactly the same, the final voice will have somewhat different characteristics according to the original voice you edited.

## SYNTHESIZER PARAMETERS

Like the preceding explanations, this summary contains some oversimplifications. Though technically not always completely "correct", it will give you an overall picture of each voice parameter's functions.

The range of possible settings is given for each parameter, showing the minimum and maximum values.

### [0/1] ATTACK RATE

Range: 0 — 63

The OPERATOR 2 ATTACK RATE [1] determines the time it takes for the volume of the sound to rise from zero to peak level. A low value represents a slow rate, so the attack will take time, with the initial volume increasing gradually like that of a violin or human voice. On the other hand, high values mean a fast attack, similar to that of an organ or piano, where the sound volume reaches its peak level almost as soon as keys are pressed.

OPERATOR 1 ATTACK RATE [0] influences the change in tonal quality over time, for instance creating a "wah" effect.

### [2/3] DECAY RATE

Range: 0 — 63

The OPERATOR 2 DECAY RATE [3] sets the time it takes for the volume of the sound to drop from peak level back to zero. A high value causes a fast decay, so the sound will fade away quickly when a key is pressed — plucked instruments like harp, koto or harpsichord have such fast decays. Low values mean the sound will continue even if the keys are pressed for a long time, like that of an organ or violin. The OPERATOR 1 DECAY RATE [2] influences the change in tonal quality over time.

### [4/5] FREQUENCY

Range: 0 — 15

The basic pitch of a sound is determined by the OPERATOR 2 FREQUENCY [5] value. In principle, doubling the value raises the pitch by one octave.

The FREQUENCY [4] of OPERATOR 1 also influences the pitch as well as the tonal quality of the sound. It is the ratio between the two FREQUENCY values (for example 1:1, or 1:3 = 2:6, etc.) that results in different wave forms and thus different sound characteristics.

### [6] FEED BACK LEVEL

Range: 0 — 7

This parameter regulates the self-modulation of OPERATOR 1. The effect is similar to that of the following parameter, and the settings of both strongly influence each other.

### [7] MODULATION LEVEL

Range: 0 — 99

In general, raising the MODULATION LEVEL makes the sound sharper, while decreasing this parameter gives a milder sound.

This is the most fundamental voice parameter, literally forming the heart of FM (frequency modulation). If it is set to 00, the parameter settings for OPERATOR 1 ([0], [2], [4] and [6]) will have no effect whatsoever.

### [8] TOTAL LEVEL

Range: 0 — 99

The final parameter simply adjusts the output level of OPERATOR 2. In other words, it determines the overall volume of a voice.

## What is MIDI?

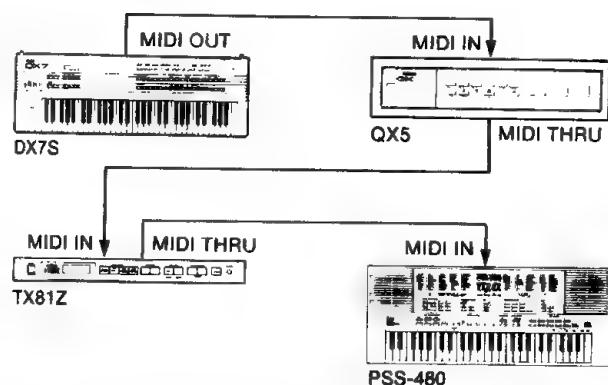
MIDI stands for "Musical Instrument Digital Interface". It is an international standard interface system that allows musical instruments such as your PortaSound PSS-480, synthesizers, drum machines, sequence recorders, computers and other equipment to "communicate".

The most basic MIDI functions are something like a highly advanced remote control — they let you play other instruments from the PortaSound, using its keyboard, the PERCUSSION keys and the SONG MEMORY, or control the PSS-480 FM and PCM sound sources from external MIDI equipment.

## MIDI IN, OUT Connections

On the rear panel of the PSS-480, you will find two MIDI connectors labeled IN and OUT (21).

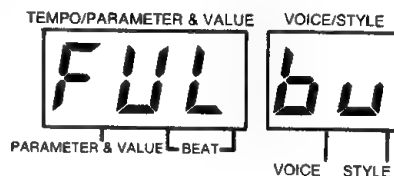
IN is for the reception of MIDI data. This allows you to control the PortaSound via MIDI signals received at the IN terminal. These signals might be produced "live" by you yourself playing another keyboard, or in recorded form by a sequencer for an automated performance.



This setup uses the DX7S synthesizer to program the QX5 sequence recorder and play the PortaSound plus the TX81Z FM tone generator. The PSS-480 and TX81Z can also be controlled by QX5 sequences.

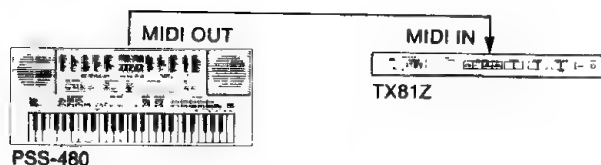
- Whenever MIDI data is received, the VOICE indicator dot (in Style Select mode) or STYLE indicator dot (in VOICE select mode) will blink. This allows you to confirm visually whether MIDI reception is working properly.

- If too much MIDI data is received at once, the message



will appear, indicating that the "buffer is full".

The MIDI OUT terminal is for transmission of MIDI data from the PortaSound itself. Again, this may be real-time ("live") information from, say, the keyboard, or a VOICE SELECT button for program selection, or data recorded in the SONG MEMORY.



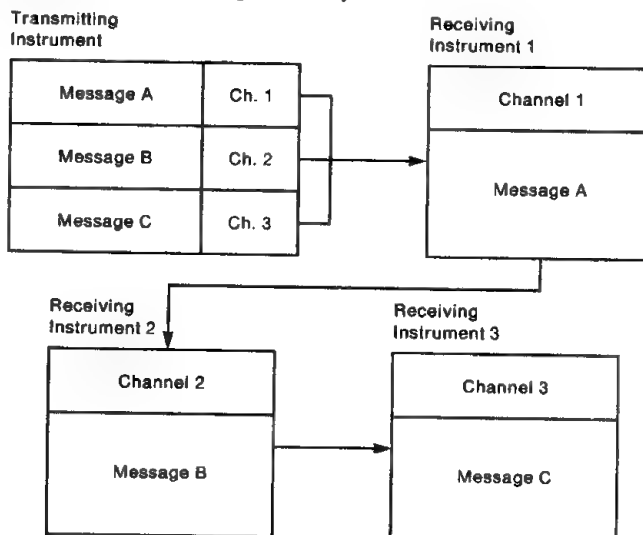
In the above simple hook-up, the PSS-480 is used to play the TX81Z FM tone generator.

- Use special MIDI cables for the above type of connections.

Some more examples for practical MIDI hook-ups are given at the end of this chapter.

## 16 Channel Control

MIDI is capable of handling up to 16 totally independent channels simultaneously on a single cable. This is made possible by coding each individual MIDI message (data group) with a channel number from 1 to 16. Most MIDI equipment can be set to transmit or receive data on channels which can be freely specified by the user.



When a MIDI instrument receives information coded with its "own" channel number (the one specified for reception on that unit), it will execute the command. If the data is coded with a different MIDI channel number, the command will simply be ignored and the instrument will wait for the next message. Hooking up various kinds of MIDI equipment such as synthesizers and tone generators to the same MIDI OUT terminal therefore can provide totally individual simultaneous control over up to 16 different instruments.

As far as individual channel control is concerned, the PortaSound PSS-480 itself works like several synthesizers (tone generators) and a drum machine at once. Using the RECEIVE CH. FILTER functions explained below, it can accept a variety of data on different channels at the same time, thus playing several individual FM voices plus PCM percussion simultaneously.

## MIDI MODE [C]

### Overview

The PortaSound PSS-480 has two MIDI modes with very different applications. Generally speaking, you should choose Keyboard Assign mode to play other MIDI equipment from the PortaSound, and Sound Source mode when you want to use the PSS-480 as a multi-timbral (multi-voice/multi-channel) sound source controlled by external MIDI sequencers or keyboards.

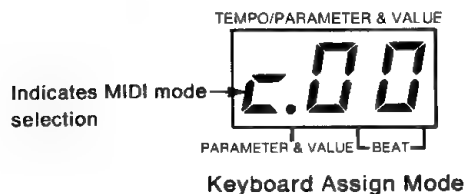
The types of MIDI data transmitted and received by the PSS-480 in these two modes are detailed below.

### Operation

To switch between these two MIDI modes,

1. **press the button labeled MIDI MODE [C] in the MIDI section (9).**

The TEMPO/PARAMETER & VALUE display will indicate



The display [C.00] shows that the PSS-480 is set to Keyboard Assign mode (the default setting). To switch to Sound Source Mode,

2. **press +.**

The display will show [C.99], indicating Sound Source mode.



- You can switch back and forth between MIDI MODES with the VALUE + and - buttons.

#### Note:

In Sound Source mode, no sound is produced when playing the keyboard, the DEMONSTRATION cannot be started, and most buttons do not work.

# Keyboard Assign Mode [00]

## Transmitted Data

In this mode, Timing Clock, Start/Stop and note on/off data are transmitted. The 16 MIDI channels are used to send the following information:

Channel	Information
1 to 16 (assignable)	<p><b>MANUAL PERFORMANCE Data</b> Any of the 16 channels can be assigned for transmission of normal keyboard performance data, i.e. the melody and accompaniment you play all by yourself. If an AUTO ACCOMPANIMENT feature is being used, only key data from the MELODY SECTION will be transmitted. Default channel is 1.</p> <p><b>MELODY MEMORY Data</b> The performance data from MELODY banks 1 to 5 is transmitted on the MIDI TRANSMIT channel that was selected when the bank was recorded. It is possible to change this stored channel number during record standby while the MELODY bank indicator is blinking with alternating long/short intervals (see p.22). Simply select the new channel with TRANSMIT CH. [P], then press the MELODY bank button again so that its indicator goes out. The TRANSMIT channel selected during recording is also chosen for transmission when several banks have been used as a "set" for a polyphonic MELODY.</p>
11	CHORD key note data
12 to 14	Key note data for ORCHESTRA parts 1 (ch 12) thru 3 (ch 14).
15	BASS key note data
16	RHYTHM key note data.

- A MIDI OUT CHANNEL list is printed on the front panel of the PortaSound for easy reference.

## Points To Remember

- If the TRANSPOSE function is being used, it will affect all transmitted key note data except the rhythm part.
- The MELODY VOL. setting determines the transmitted key on velocity data (i.e. how loud the basic sound of the controlled external instruments will be).
- In the case of the Auto Accompaniment sounds, the velocity data is preset for each style and each of its parts.

## MIDI Key Numbers and Percussion Sounds

KEY NAME	MIDI KEY#	TRANSMITTED AS...	ACCEPTED AS...
D1	38 (26H)	X	SNARE
D#1	39 (27H)	X	X
E1	40 (28H)	X	X
F1	41 (29H)	X	X
F#1	42 (2AH)	X	X
G1	43 (2BH)	X	X
G#1	44 (2CH)	X	BASS DRUM
A1	45 (2DH)	BASS DRUM	BASS DRUM
A#1	46 (2EH)	X	RIM SHOT
B1	47 (2FH)	X	TOM LOW
C2	48 (30H)	X	TOM LOW
C#2	49 (31H)	X	SNARE
D2	50 (32H)	TOM LOW	TOM LOW
D#2	51 (33H)	RIM SHOT	RIM SHOT
E2	52 (34H)	SNARE	SNARE
F2	53 (35H)	TOM HI	TOM HI
F#2	54 (36H)	X	X
G2	55 (37H)	X	X
G#2	56 (38H)	X	X
A2	57 (39H)	HI-HAT CLOSED	HI-HAT CLOSED
A#2	58 (3AH)	X	X
B2	59 (3BH)	HI-HAT OPEN	HI-HAT OPEN
C3	60 (3CH)	CRASH CYMBAL	CRASH CYMBAL
C#3	61 (3DH)	X	CRASH CYMBAL
D3	62 (3EH)	X	RIDE CYMBAL
D#3	63 (3FH)	RIDE CYMBAL	RIDE CYMBAL

## Program Change Data

is transmitted

- on the manual performance transmission channel whenever a program change (voice selection) is carried out,
  - on all channels when the style is switched (because this changes the various Auto Accompaniment voices), with the style number itself being output on channel 16, and
  - whenever the rhythm is started.
- If a MELODY memory bank is selected while the rhythm is playing, the corresponding program change data is also transmitted.

## Control Change Data

Vibrato, Sustain and Portamento ON/OFF information is transmitted as part of the manual performance and MELODY memory data. In other words, any changes you make (or have recorded) concerning these settings, such as turning Sustain on or off, are transmitted to the connected MIDI equipment.

## Memory Bulk Dump

### Overview

All data stored in the PortaSound's internal RAM — the five DIGITAL SYNTHESIZER voice banks, the SONG MEMORY banks and the CUSTOM DRUMMER pattern — can be dumped to an external MIDI memory device (or another PSS-480 or PSS-680) as system exclusive data.

System exclusive messages are reserved for use by individual manufacturers for communication between specific devices. Only certain YAMAHA equipment or computers etc. that recognize the YAMAHA ID can accept or transmit such data. When the PortaSound PSS-480 receives system exclusive messages with the corresponding ID code, this data is stored in the internal memories so that their settings become the same as on the transmitting equipment. During this process, the PortaSound is not operative.

Though Digital Synthesizer, Melody Memory, Chord Memory and Custom Drummer data all form independent parts of the system exclusive data, they are always transmitted together as explained below.

For details on the exclusive data format, see p. Add-1.

Before carrying out the following steps, make sure the receiving equipment is set for MIDI data reception. (No channel specification is necessary.)

### Operation

- Press **TRANSMIT CH/MEMORY BULK DUMP [P]** twice.
  - If the PortaSound is already in TRANSMIT CHANNEL select mode (indicated by an [P] on the TEMPO/PARAMETER & VALUE display), press this button only once. The TEMPO/PARAMETER & VALUE display will start to blink, showing that the PortaSound is ready for memory bulk dump.
- Press the **VALUE +** button.

This starts the bulk dump. (The TEMPO/PARAMETER & VALUE display goes out during transmission.) Completion of the bulk data dump is indicated by the display lighting up again. The PortaSound then enters TRANSMIT CH. select mode.

  - To exit Memory Bulk Dump mode without carrying out the data dump, press TRANSMIT CH/MEMORY BULK DUMP [P] again instead of the VALUE + button.

### Reception

The PSS-480 will accept exclusive messages in ANY condition — no particular setting is necessary. During reception, the PortaSound is totally inoperative, but one indicator dot will blink to indicate MIDI communication. After a bulk dump, the RAM contents of the receiving equipment will correspond to that of the transmitting unit.

If reception of the bulk dump was not successful, the error message



will appear on the display. In this case, repeat the bulk dump.

#### Note:

Only that part of the data where the error occurred is reset. All other system exclusive data is received correctly. In other words, if an error for instance occurred during transmission of the digital synthesizer bank 1, only this data will be reset while all other system exclusive data is received as intended.

## Received Data

---

With the exception of channel 16, all note ON/OFF data is used to play the selected voice. Only MIDI note numbers corresponding to the keyboard's four octave range plus one octave higher are accepted. Velocity data is NOT accepted in this mode, but can be received in Sound Source mode 99.

- As the default setting, all channels 1 to 16 are on for reception. Any channel can be turned on or off with the RECEIVE CH. FILTER [d] button (see below).

### Channel 16

Note data received on channel 16 is accepted as percussion data. See the table on page 31.

### Program Change Data

Program change data received on channels 1 to 15 switches the selected voice, while program changes on channel 16 switch the style.

On channels 1 thru 15, program change values from 00 to 99 select voices from 00 to 99, while values from 100 to 104 access the DIGITAL SYNTHESIZER voice banks 1 to 5. Values from 105 to 127 select the voices from 00 to 22.

On channel 16, program change values from 00 to 99 select styles from 00 to 99. Values from 100 to 127 select styles from 00 to 27.

### Control Change Data

Portamento ON/OFF and modulation (vibrato) ON/OFF and sustain ON/OFF data are received.

### System Real Time Messages

Start, Stop and Timing Clock data are accepted. However, if no external clock data is received, the PortaSound uses its internal clock.

- The external clock can be turned on and off as explained on p.35, "MIDI RECEIVE CHANNEL FILTER".
- All panel settings remain valid during data reception, only the tempo control will not work if external clock data is being received.



## Transmitted Data

All normal (manual) keyboard performance data is transmitted, but no corresponding sound is produced by the PortaSound ("local off"). This means that you can control external MIDI sound sources from the PSS-480 keyboard even while the PortaSound is "muted".

Channel settings are the same as for Keyboard Assign mode. Bulk dumps can also be performed in this mode.

## Received Data

During data reception in the Sound Source mode, all front panel functions are inoperative except MIDI RECEIVE CHANNEL, TRANSMIT CHANNEL and MODE selection, MELODY VOLUME, MASTER VOLUME, TRANSPOSE, and the REVERB EFFECT.

Note on/off and velocity data is accepted on all channels specified with the RECEIVE CHANNEL FILTER. In other words, you can play the PortaSound PSS-480 from an external keyboard or sequencer as a velocity sensitive (dynamic volume) sound source.

MIDI note numbers from 24 to 108 are accepted in this mode, meaning you can play the PortaSound over a full 7 octave range not limited by the instruments keyboard.

The data received on channel 16 is treated as rhythm data (see the tables on page 31). Program changes on channel 16 are ignored. Since Note On Velocity is accepted, you can play the PortaSound's percussion instruments as a dynamic drum tone generator.

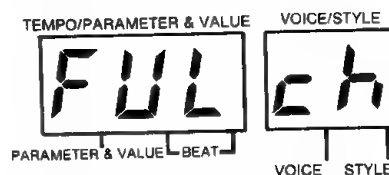
## Dynamic Allocation

The note on/off data received on channels 1 thru 15 is "dynamically allocated" to the respective sound sources (voices). Program changes are accepted independently for each channel, and the note on/off data received on these channels always plays the corresponding voice. In other words, the PSS-480 functions as a multi-timbral sound source, able to play a number of individual timbres in up to 12-voice polyphony, each on different MIDI channels.

## Points to Remember

- The default value is voice number 00 for all channels. Once this is changed through reception of program change data on individual channels, the new voice numbers are stored except when Sound Source mode 99 is exited or power to the PortaSound is turned off. When power is turned off, then on again, or when MIDI mode is switched to 99 after having been set to 00, the currently selected voice number becomes the default voice number for all channels.
- The PSS-480 of course remains 12-voice polyphonic in this mode too. If the received data would necessitate the playing of more than 12 notes simultaneously, the oldest data is ignored and only the last 12 notes received are played.

When this happens, the message



meaning "channel full", appears on the display.

- In mode 99, Start, Stop and Timing Clock data are ignored. Sustain on/off and modulation (vibrato) on/off is also accepted. Remember, though, that each voice has its own default setting for sustain and vibrato, which is automatically chosen whenever that voice selected via program change. This default setting may of course be changed by transmitting the appropriate control change data to the PortaSound.

## Program Change Data

As in the keyboard assign mode, program change values from 00 to 99 select voices from 00 to 99, while values from 100 to 104 access the DIGITAL SYNTHESIZER voice banks 1 to 5. Values from 105 to 127 select voices from 00 to 22.

## MIDI RECEIVE CHANNEL FILTER [d]

### ■ Overview

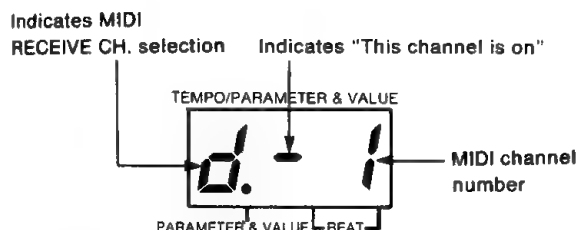
This function allows you to choose on which of the 16 MIDI channels the PortaSound will receive data in either MIDI RECEIVE MODE, Keyboard Assign 00 or Sound Source 99. It also lets you determine whether the PSS-480 will be controlled by external or internal clock data.

To select these reception channels individually for the two modes, the corresponding MIDI MODE (00 or 99) must be chosen before performing the following settings.

### ■ Operation

#### 1. Press RECEIVE CH. [d].

The TEMPO/PARAMETER & VALUE display will change to



This display shows that channel 1 is selected for MIDI reception.

A minus sign “-” in front of the displayed MIDI channel number indicates that this channel is set to receive MIDI data.

#### 2. Turn this channel on or off with the VALUE buttons.

Pressing - causes the minus sign to disappear, meaning that MIDI data will not be received on the displayed channel. Press + to turn it on again.

#### 3. Use RECEIVE CH. [d] to call up the other channels.

Each time you press RECEIVE CH. [d], the display will switch to the next MIDI channel, starting again from channel 1 after channel 16 (or “c” when in “00” mode only) has been displayed.

As explained in step 2., you can turn the displayed channel on or off with the VALUE buttons.

- After channel 16 has been called up, pressing RECEIVE CH. [d] again displays a “c” for “clock” (in 00 mode only). This parameter turns the external clock reception on (indicated by a minus sign) or off as shown in step 2., allowing you to switch between internal and external clock control.
- The PortaSound remembers these MIDI RECEIVE CHANNEL SETTINGS even when power is turned off.
- Two different groups of MIDI RECEIVE CHANNEL settings are stored separately for the two MIDI modes, 00 and 99. Selecting one of these modes au-

tomatically selects the corresponding MIDI RECEIVE CHANNEL settings.

- At delivery, all channels are on for reception (corresponds to OMNI mode). In mode 00, the external clock is off.

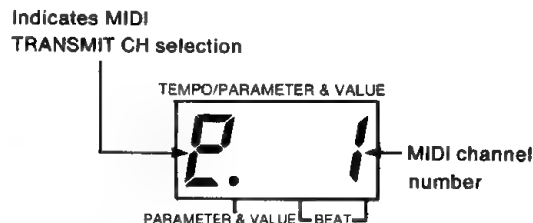
## TRANSMIT CHANNEL [P] Selection

### ■ Overview

This function allows you to select one MIDI channel for transmission of “live” data (= the data of your current manual performance) to external MIDI equipment.

### ■ Operation

#### 1. Press TRANSMIT CH [P].



This display shows that channel 1 is selected for MIDI transmission.

The displayed MIDI channel number is the one currently set to transmit MIDI data.

#### 2. Set the MIDI channel with the VALUE buttons.

Pressing + raises the channel number while - lowers it. (The display continues to change when 16 or 1 is reached.)

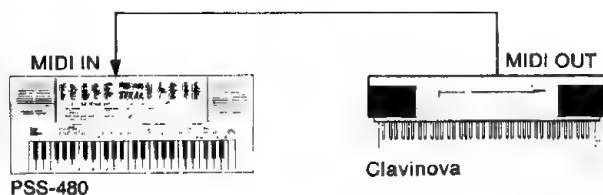
- The TRANSMIT CH. number is memorized even when power is turned off. The default value is 1.
- Pressing TRANSMIT CH. [P] again enters Memory Bulk Dump mode, explained above. If you mistakenly entered this mode, press TRANSMIT CH. [P] once more to be able to select the transmission channel.

# MIDI CONNECTION EXAMPLES

The following hook-ups are suggestions that will help you make the most of your PortaSound's sophisticated MIDI functions. The first three examples show how you can play the PSS-480 via external MIDI equipment, while example four gives you ideas for controlling other sound sources from the PortaSound. Example 5 shows connection to a simple MIDI recorder. Finally, hooking the PSS-480 to a sequencer allows mutual control that even lets you edit the SONG MEMORY data.

## 1 PortaSound — Standard Keyboard

If you find the PortaSound's mini keys somewhat difficult to use and would prefer to play the PSS-480 from a standard-sized keyboard, simply make the following connections:

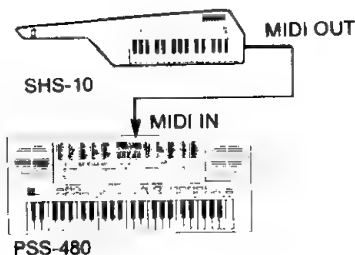


Set the PSS-480 to MIDI MODE 00, and make sure that the receive and transmit channels correspond on both instruments. You can now play the PortaSound from the external keyboard. Besides, you can use the front panel controls of the PSS-480 to change any settings as desired.

- If you have a touch sensitive standard keyboard and want to play the PortaSound with velocity data for more expression, select MIDI MODE 99 instead. Note, however, that you will not be able to use the front panel controls in this mode.

## 2 PortaSound — Portable Remote Keyboard

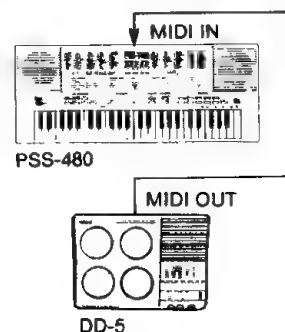
This simple connection allows you to play the PortaSound from a remote keyboard.



Set MIDI MODE to 99, especially when using a shoulder keyboard such as the SHS-10 or SHS-200. You can now play the superior sounds of the PSS-480 from the remote keyboard.

## 3 PortaSound — External Drum Pads

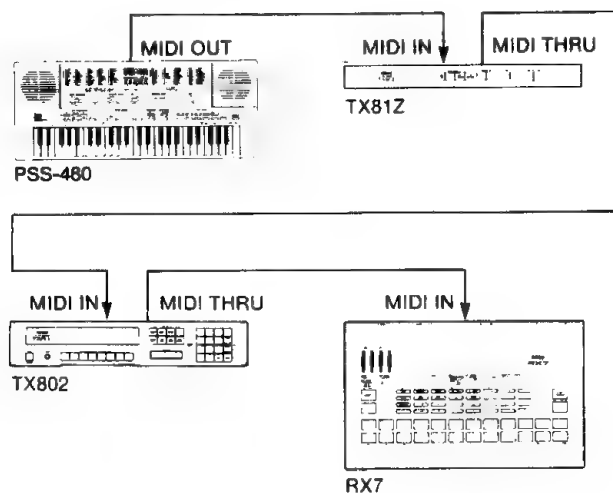
For a particularly authentic percussion feeling, we recommend connection of external drum pads such as the Yamaha Electronic Percussion Set DD-5.



Set the DD-5 MIDI output channel to 16 and the PortaSound MIDI MODE to 99, then play the excellent PSS-480 percussion sounds from the DD-5 — complete with dynamics for the breathtaking realism of an actual drum set!

## 4 PortaSound - Tone Generators

An even richer sound and more complex performance capabilities for both voices and rhythm can be achieved by connecting the PortaSound PSS-480 to one or more external tone generators and rhythm machines — particularly if they have multi-timbral capabilities such as the Yamaha TX81Z or TX802 and the RX7 rhythm composer.

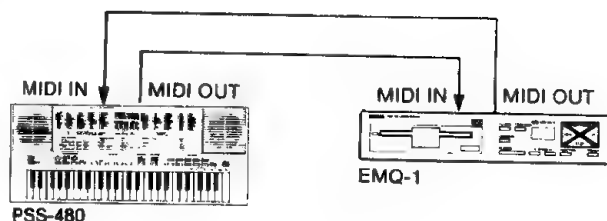


Set the PSS-480 MIDI MODE to 00, and make sure the PortaSound transmission channels and the tone generator/rhythm machine reception channels correspond. It is also a good idea to adjust the tone generator voice numbers (e.g. setting P.Change to "individual" on the TX81Z) so that choosing a PortaSound voice will automatically select a corresponding external voice.

Don't forget to make use of the PSS-480's MIDI OUT channel assignment possibilities. For instance, you can let each MELODY memory bank and Auto Accompaniment part play a different tone generator voice.

## 5 PortaSound — MIDI Recorder

To greatly expand the scope of the SONG MEMORY, you can connect your PortaSound to a MIDI recorder such as the EMQ-1.

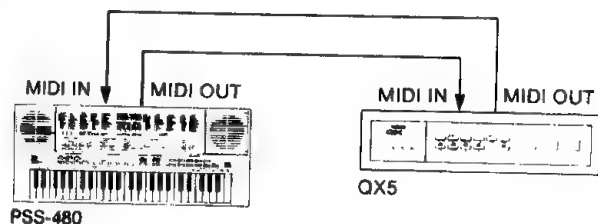


The EMQ-1 now allows you to record and overdub on several channels. If you set the PSS-480 to "00" mode, you can record in real time. Set the PortaSound to "99" mode when receiving data from the EMQ-1.

All performances can be saved on disks, so you can create your own music library. Besides, you can use the EMQ-1 for data filing (bulk dumps), thus storing your digital synthesizer settings, SONG MEMORY contents and custom drum patterns on disks. When transmitting data to, or receiving data from the EMQ-1, either mode will do, but you should set the PSS-480 to "00" mode when you actually use the received data.

## 6 PortaSound — Sequencer

The SONG MEMORY functions of the PortaSound PSS-480 are flexible and very easy — but they do not let you edit any of the memorized note data. This becomes possible when you connect the PortaSound to a sequencer as follows.



Now, all you have to do is use the SONG MEMORY as usual, then play back your recording in 00 mode while transmitting it to the sequence recorder. (Of course, you can also record "live" with the QX5 without using the PortaSound SONG MEMORY at all). The QX5 then allows you to edit (change) this data any way you want, adding, deleting and repeating parts or making your music more expressive with velocity dynamics. (When controlling the PortaSound from the QX5, set the MIDI mode to 99.) With this hookup, you can also use the sequencer to store system exclusive data (such as the Digital Synthesizer settings) and load them back to the PSS-480. You thus have a limitless number of banks for SONG MEMORY, DIGITAL SYNTHESIZER, etc. at your disposal.

## ALL RESET

### ■ Overview

Static electricity and other factors can very rarely cause the Portasound's internal microcomputer to "lock up" so that it is no longer possible to use the instrument's controls. When this happens, you can reset all internal settings to their default values.

- The contents of the RAM is erased by this procedure, canceling all settings and memorized data. Therefore, be sure to reset the PortaSound only when absolutely necessary, or when you wish to clear all stored data at once.

### ■ Operation

1. Turn off the PortaSound.
2. While simultaneously pressing the **NORMAL** and **FIN-GERED** buttons, turn on the **POWER** again.

This resets the PortaSound to the following default settings:

Digital Synthesizer ..... Voices 00 thru 04  
in BANKS 1 thru 5  
Song Memories ..... All empty  
Custom Drummer ..... Rhythm part of style 00  
MIDI Mode ..... 00  
MIDI Receive Ch. .... All on, clock off (mode 00)  
MIDI Transmit Ch. .... 1  
Auto Accompaniment **NORMAL**, full **ORCHESTRATION**  
Voice/Style ..... Both 00; set for Voice selection

#### TEMPO/PARAMETER & VALUE

DISPLAY ..... indicates Tempo 120  
Effects ..... Vibrato on, all others off  
Transpose ..... 0  
Tuning ..... 0  
Melody Volume ..... 8  
Portamento Speed ..... 3  
Custom Drummer ..... **PROGRAM OFF, PLAY OFF**  
Percussion ..... **OFF**  
Synchro Break ..... **ON**

# SPECIFICATIONS

## Key board

49 keys (C<sub>1</sub> ~ C<sub>5</sub>)

## Voice ("00 ~ 99")

Synth Brass, Jazz Organ, Pipe Organ 1, Piano 1, Harpsichord 1, Electric Piano 1, Celesta, Vibraphone, Marimba 1, Steel Drum 1, Violin 1, Cello, Jazz Guitar, Rock Guitar 1, Wood Bass 1, Trumpet, Trombone, Horn, Soprano Sax, Clarinet, Flute, Oboe, Harmonica, Whistle, Music Box, Honky-Tonk Piano, Toy Piano, Transistor Organ, Tremolo Organ, Small Church Organ, Funky Clavi, Accordion, Glockenspiel, Hawaiian Guitar, Banjo, Bowed Bass, Acoustic Guitar, Harp, Picked Bass, Slap Bass, Ukulele, Strings, Alpenhorn, Bagpipe, Mute Trumpet, Tenor Sax, Jug, Panflute, Ice Block, Reed Organ, Electronic Organ, Pipe Organ 2, Piano 2, Harpsichord 2, Electric Piano 2, Glass Celesta, Bandoneon, Street Organ, Synth Bass, Marimba 2, Steel Drum 2, Chimes, Tubular Bells, Hand Bell, Carillon, Synth Tom, Timpani, Violin 2, Rock Guitar 2, Tremolo Guitar, Rock Guitar 3, Pedal Steel Guitar, 12String Guitar, Classic Guitar, Mandolin, Sitar, Koto, Shamisen, Jamisen, Mute Bass, Electric Bass, Wood Bass 2, Electric Trumpet, Wow Trumpet, Tuba, Alto Sax, Bass Clarinet, Bassoon, Recorder, Ocarina, Piccolo, Samba Whistle, Brass Ensemble, Woodwind Ensemble, Human Voice 1, Human Voice 2, Human Chorus, Kazoo, Musical Saw, Sine Wave

## Style ("00 ~ 99")

Rhythm & Blues 1, Rhythm & Blues 2, Slow Blues, Gospel, Disco, Rap, Safari, Fusion 1, Fusion 2, 16Beat 1, 16Beat 2, Techno Rock 1, Techno Rock 2, Funk 1, Funk 2, Funk 3, Funk 4, Rock'n' Roll 1, Rock'n' Roll 2, Rock'n' Roll 3, Rock-a-Ballad, Hard Rock, Heavy Metal, Speed Metal, Pop Rock 1, Pop Rock 2, Rock Baroque, Christmas Rock, Oriental Rock, Brass Rock, Swing Guitar, Swing Piano, Swing Organ, Swing Vibraphone, Big Band 1, Big Band 2, Big Band 3, Big Band (Waltz), Modern Jazz, Jazz Waltz, 5/4 Swing, Jazz Ballad, Shuffle, Boogie Woogie Piano 1, Boogie Woogie Piano 2, Boogie Woogie Piano 3, Boogie Big Band 1, Boogie Big Band 2, Dixieland Combo, Dixieland Banjo, Jazz Baroque, Bossa Nova 1, Bossa Nova 2, Samba 1, Samba 2, Samba 3, Salsa 1, Salsa 2, Salsa 3, Tango, Habanera, Mambo 1, Mambo 2, Mambo 3, Rhumba, Cha-Cha-Cha, Conga, Merengue, Calypso 1, Calypso 2, Son Afro, Reggae, Cuban, Beguine, Island Folklore, Mariachi, Argentine Folklore, March 1, March 2, Majestic March, Fanfare, Lullaby, Baroque, Baroque (Waltz), String Quartet, Viennese Waltz, Polka, Bolero, Flamenco, Classical Guitar, Ragtime Piano, Country, Country Piano, Country Steel Guitar, Bluegrass, Street Organ, Hawaiian, Mandolin Band, Chanson, Barbershop Quartet

## Other Controls

### AUTO ACCOMPANIMENT

MODE: NORMAL, FINGERED, SINGLE FINGER  
ORCHESTRATION: BASS, RHYTHM, CHORD, ORCHESTRA

### SONG MEMORY

CHORD 1 ~ 5, MELODY 1 ~ 5, RECORD

### EFFECT

VIBRATO, SUSTAIN, REVERB, PORTAMENTO, DUET

### DIGITAL SYNTHESIZER

BANK 1 ~ 5, STORE, ATTACK RATE, DECAY RATE, FREQUENCY, F.B. LEVEL, MOD. LEVEL, TOTAL LEVEL

### PARAMETER CHANGE

TEMPO, TRANSPOSE, TUNING, MELODY VOL.

### DEMONSTRATION

START/STOP

### MIDI

MIDI MODE, RECEIVE CHANNEL FILTER, TRANSMIT CH./MEMORY BULK DUMP

### Auxiliary Jacks

Headphones/Aux Out

### Main Amplifiers

Stereo 2W x 2

### Speakers

10 cm x 2 (3.9" x 2)

### Dimensions (W/D/H)

668 mm x 265.2 mm x 80 mm  
(26-1/4" x 10-3/8" x 3-1/8")

### Weight

2.7 kg (6.0 lbs.) excluding batteries

### OPTION

AC Adaptors: PA-3, PA-4 or PA-40

*Specifications subject to change without notice.*

# EXCLUSIVE DATA FORMAT

## 1. FORMAT NO. = (00H), FORMAT NAME = (FM 2OPERATOR VOICE DATA)

### HEADER & EOX

1	1	1	1	0	0	0	0
0	1	0	0	0	0	1	1
0	1	1	1	0	1	1	0
0	0	0	0	0	0	0	0
0	0	0	0	d	d	d	d
0	0	0	0	d	d	d	d
0	c	c	c	c	c	c	c
1	1	1	1	0	1	1	1

STATUS = F0H  
ID = 43H  
INST. CLASS = 76H  
FORMAT NO. = (00H)

DATA  
(DESCRIBED BELOW)

CHECK SUM DATA = TWO'S COMPLEMENT OF 7BITS SUM OF ALL DATA BYTES.  
EOX = F7H

### DATA CONTENTS

	7	6	5	4	3	2	1	0	
0	BANK NUMBER								
1	DT1				MUL				M
2									
3	X	TL							M
4	X								
5	LKS (HI)				LKS (LO)				M
6									
7	RKS		AR						M
8									
9	AM	DT	D1R						M
10	EN	2							
11	SIN TBL		D2R						M
12									
13	D1L				RR				M
14									
15	X	X	FB			X	X	X	
16	X	PMS			X	X	AMS		
17	X	X	X	X	X	X	X	X	
18	X	X	X	X	X	X	X	X	
19	X	X	X	X	X	X	X	X	
20	X	X	X	X	SRR				M
21	X	X	X	X					
22	X	VDT							
23	X	X	X	X	X	X	X	X	
24	V	S	X	X	X	X	X	X	
25	X	X	X	X	X	X	X	X	
26	X	X	X	X	X	X	X	X	
27	X	X	X	X	X	X	X	X	
28	X	X	X	X	X	X	X	X	
29	X	X	X	X	X	X	X	X	
30	X	X	X	X	X	X	X	X	
31	X	X	X	X	X	X	X	X	
32	X	X	X	X	X	X	X	X	

M. MODULATOR C. CARRIER

BANK NUMBER: INDICATES THE NUMBER OF BANK TO WHICH FOLLOWING DATA HAVE TO BE SENT.  
0~4 MEANS BANK#1~5. ANY DATA OVER 4 IS ACCEPTED AS 0.

X: DOES NOT MATTER.

DT1: FINE DETUNE (THE 4TH BIT IS SIGN BIT. OTHER 3BITS STAND FOR ABSOLUTE VALUE.)

DT2: COARSE DETUNE (1: +600CENTS, 0: DISABLE)

MUL: MULTIPLE NUMBER OF FREQUENCY

TL: TOTAL LEVEL 0000000 = 99 OF PANEL DATA

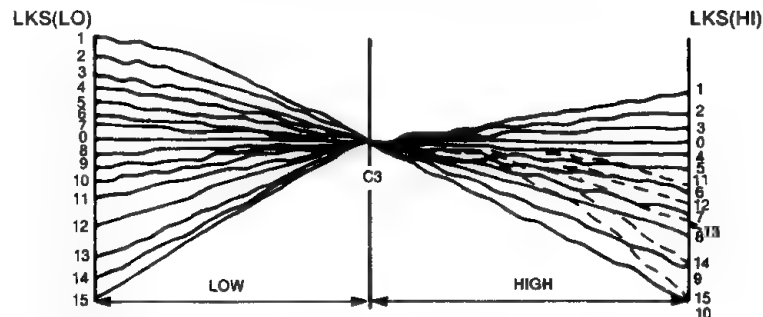
0000001 = 98 OF PANEL DATA

1100011 = 00 OF PANEL DATA

1111111 = 00 OF PANEL DATA

LKS(HI): LEVEL KEY SCALING (SEE BELOW)

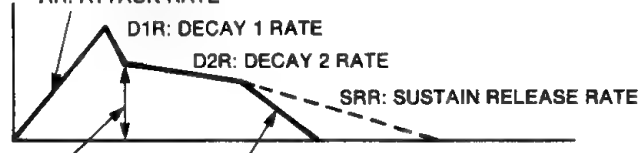
LKS(LO): LEVEL KEY SCALING (SEE BELOW)



RKS: RATE KEY SCALING

AR, D1R, D2R, D1L, RR, SRR: ENVELOPE GENERATOR PARAMETERS (SEE BELOW)

AR: ATTACK RATE



D1L: DECAY 1 LEVEL RR: RELEASE RATE

AMEN: AMPLITUDE MODULATION ENABLE 1: ON, 0: OFF

SIN TBL: SINE TABLE FORM

0: SINE WAVE

1: SQUARED SINE WAVE

2: SINE HALF WAVE

3: SQUARED SINE HALF WAVE

FB: FEED BACK LEVEL

PMS: PITCH MODULATION (VIBRATO) SENSITIVITY

AMS: AMPLITUDE MODULATION SENSITIVITY

VDT: VIBRATO DELAY TIME

V: VIBRATO ENABLE

1: ON, 0: OFF

S: SUSTAIN ENABLE

1: ON, 0: OFF

## 2. FORMAT NO. = (01H). FORMAT NAME = (MELODY MEMORY 5BANKS)

### HEADER & EOX

1	1	1	1	0	0	0	0
0	1	0	0	0	0	1	1
0	1	1	1	0	1	1	0
0	0	0	0	0	0	0	1
0	0	0	0	d	d	d	d
0	0	0	0	d	d	d	d
0	c	c	c	c	c	c	c
1	1	1	1	0	1	1	1

STATUS = F0H  
ID = 43H  
INST. CLASS = 76H  
FORMAT NO. = 01H

DATA  
(DESCRIBED BELOW)

CHECK SUM DATA = TWO'S COMPLEMENT OF 7BITS SUM OF ALL DATA BYTES.  
EOX = F7H

### DATA CONTENTS

	7	6	5	4	3	2	1	0
0	X	X	X	X	X	X	X	X
1	MELODY DATA BANK 1							
1001	MELODY DATA BANK 2							
2001	MELODY DATA BANK 3							
3001	MELODY DATA BANK 4							
4001	MELODY DATA BANK 5							
5001	0	0	0	GD				
	0	0	0					
	0	0	0					
	0	0	0					
	0	0	0					
5006	PBR							
5011	0	0	0	0	MVOL			
	0	0	0	0				
	0	0	0	0				
	0	0	0	0				
	0	0	0	0				
5016	0	0	0	0	MTC			
	0	0	0	0				
	0	0	0	0				
	0	0	0	0				
	0	0	0	0				
5021	0	0	0	0	0	PS		
	0	0	0	0	0			
	0	0	0	0	0			
	0	0	0	0	0			
	0	0	0	0	0			
5025	0	0	0	0	0			

NOTICE: FOLLOWING DATA BYTES ARE TO BE DIVIDED INTO 4BIT DATA AND SENT AS LESS- SIGNIFICANT 4BITS OF DATA PART. SIGNIFICANT 4BITS ARE SENT FIRST.

XXXXXXXX: DOES NOT MATTER

### MELODY DATA FORMAT

DURATION 

1	0	D	D	D	D	D	D
---	---	---	---	---	---	---	---

 DDDDDD = TIME LENGTH  
(DDDDDD) DECIMAL = 24 \* BEAT - 1  
-EXAMPLES-  
000000 = 1/24BEAT  
010111 = 1BEAT  
111111 = 8/3BEAT

KEY ON 

0	1	N	N	N	N	N	N
---	---	---	---	---	---	---	---

 NNNNNN = KEY NUMBER (0~60)  
000000 = C1 (MIN KEY NOTE)  
111100 = C6 (MAX KEY NOTE)

KEY OFF 

0	0	N	N	N	N	N	N
---	---	---	---	---	---	---	---

 NNNNNN = KEY NUMBER (0~60)  
000000 = C1 (MIN KEY NOTE)  
111100 = C6 (MAX KEY NOTE)

VOICE CHANGE 

1	1	1	1	1	1	1	0
0	T	T	T	T	T	T	T

 TTTTTT = VOICE NUMBER (0~104)  
0~99: VOICE#00~99  
100~104: SYNTH BANK 1~5

PITCH BEND 

1	1	0	B	B	B	B	B
---	---	---	---	---	---	---	---

 BBBBBB = LESS SIGNIFICANT 7BIT OF THE SUM OF THIS DATA WILL BE CURRENT PITCH BEND VALUE.  
40H = CENTER 7FH=MAX 00H=MIN  
DEFAULT VALUE IS 40H  
POSITIVE DATA = 00001~01111  
NEGATIVE DATA = 11111~10000 (2'S COMPLEMENT)

EFFECT SWITCH STATUS 

1	1	1	0	P	R	S	V
---	---	---	---	---	---	---	---

 P: PORTAMENTO  
R: REVERB  
S: SUSTAIN  
V: VIBRATO 1: ON 0: OFF

END OF SONG 

1	1	1	1	1	1	1	1
---	---	---	---	---	---	---	---

### OTHERS

GD: GROUPING DATA 

0	0	0	e	d	c	b	a
---	---	---	---	---	---	---	---

 a = CONNECTION WITH BANK#1  
b = CONNECTION WITH BANK#2  
c = CONNECTION WITH BANK#3  
d = CONNECTION WITH BANK#4  
e = CONNECTION WITH BANK#5  
1: TOGETHER, 0: SEPARATED

IF SEVERAL BANKS ARE TOGETHER, ALL APPROPRIATE BITS OF EACH BANK SHOULD BE 1.  
CONNECTION WITH ITSELF ENABLES PLAYBACK OF THE BANK.

PBR: PITCH BEND RANGE POSITIVE DATA = 00000001~00001100  
NEGATIVE DATA = 11111111~11110100 (2'S COMPLEMENT)

MVOL: MELODY VOLUME 1~9: MELODY VOLUME VALUE 1~9

MTC: MIDI TRANSMIT CHANNEL 0~15: CHANNEL 1~18

PS: PORTAMENTO SPEED 1~5: 1~5 OF PANEL DATA.

NOTICE: ANY DATA WHICH EXCEEDS THE LIMITS SHOWN ABOVE MAY CAUSE UNEXPECTED TROUBLE ON SLAVE INSTRUMENT.



### 3. FORMAT NO. = (02H), FORMAT NAME = (CHORD MEMORY DATA)

#### HEADER & EOX

1	1	1	1	0	0	0	0
0	1	0	0	0	0	1	1
0	1	1	1	0	1	1	0
0	0	0	0	0	0	1	0
0	0	0	0	d	d	d	d
0	0	0	0	d	d	d	d
0	c	c	c	c	c	c	c
1	1	1	1	0	1	1	1

STATUS = F0H  
ID = 43H  
INST. CLASS = 76H  
FORMAT NO. = 02H

DATA  
(DESCRIBED BELOW)

CHECK SUM DATA = TWO'S COMPLEMENT OF 7BITS SUM OF ALL DATA BYTES.  
EOX = F7H

#### DATA CONTENTS

	7	6	5	4	3	2	1	0
0	BANK NUMBER							
1	0	S	S	S	S	S	S	S
2	0	X	X	X	X	X	X	X
3	0	0	0	D	H	A	O	T
4	0	0	0	0	0	0	0	0
5	0	0	0	0	1	1	1	1
6	CHORD SEQUENCE DATA							
201	TEMPO							

INITIAL VALUES

NOTICE: FOLLOWING DATA BYTES ARE TO BE DIVIDED INTO 4BIT DATA AND SENT AS LESS-SIGNIFICANT 4BITS OF DATA PART. SIGNIFICANT 4BITS ARE SENT FIRST.

#### BANK NUMBER

U U U U U U U U

UUUUUUUU = BANK#, TO WHICH FOLLOWING DATA WILL BE SENT.  
0 ~ 4 MEANS BANK#1 ~ 5. ANY DATA OVER 5 IS ACCEPTED AS 0.

#### CHORD SEQUENCE DATA FORMAT

MMM: MEASURE COUNT  
0000 = SAME MEASURE  
0001 = NEXT MEASURE  
1111 = 15 MEASURES AFTER.  
(FOR THE VERY FIRST OF CHORD SEQUENCE DATA. THIS MUST BE 0001)

BBB: BEAT COUNT  
000 = 1ST BEAT  
001 = SECOND BEAT  
111 = 8TH BEAT  
(THIS NUMBER CANNOT EXCEED THE BEAT NUMBER OF EACH STYLE.)

CHORD NAME

0 M M M M B B B  
R R R R C C C C

RRRR: ROOT NOTE OF CHORD  
0000 = C, 0001 = C#, 0010 = D, 0011 = D#, 0100 = E, 0101 = F, 0110 = F#, 0111 = G, 1000 = G#, 1001 = A, 1010 = A#, 1011 = B,

CCCC: CHORD TYPE  
0000 = M, 0001 = m, 0010 = 7th, 0011 = m7th, 0100 = M7th, 0101 = mM7th, 0110 = m7th-5, 0111 = 7SUS4, 1000 = AUG, 1001 = DIM, 1010 = 6th, 1011 = m6th, 1100 = 7th-5,

RHYTHM CONTROL SWITCHES

1 M M M M B B B  
1 1 0 Z Y X W V

V = FILL IN 1, W = FILL IN 2,  
X = FILL IN 3, Y = ENDING, Z = STOP  
ONLY ONE OF THESE BITS IS ALLOWED TO BE 1.

MELODY MEMORY SWITCHES

1 M M M M B B B  
1 0 0 a b b b b

bbbb: BANK#  
0000 = 1, 0001 = 2, 0010 = 3, 0011 = 4, 0100 = 5  
a: ON/OFF 1 = ON, 0 = OFF (WHEN a = 1, BBB MUST BE 000)

ORCHESTRATION SWITCHES

1 M M M M B B B  
1 1 1 D H A O T

A = BASS, O = ORCHESTRA,  
H = CHORD, T = RHYTHM,  
D = CUSTOM DRUMMER PLAY 1: ON, 0: OFF

STYLE NUMBER CHANGE

1 M M M M 0 0 0  
0 S S S S S S S

SSSSSS = STYLE# MUST BE 0 ~ 99 (BBB: BEAT COUNT MUST BE 000)

TEMPO

T T T T T T T T

TTTTTTTT = TEMPO MUST BE 10~220

NOTICE: ANY DATA WHICH EXCEEDS THE LIMITS SHOWN ABOVE MAY CAUSE UNEXPECTED TROUBLE ON SLAVE INSTRUMENT.

#### 4. FORMAT NO. = (03H), FORMAT NAME = (RHYTHM PATTERN DATA )

##### HEADER & EOX

1	1	1	1	0	0	0	0
0	1	0	0	0	0	1	1
0	1	1	1	0	1	1	0
0	0	0	0	0	0	1	1
0	0	0	0	d	d	d	d
				?			
0	0	0	0	d	d	d	d
0	c	c	c	c	c	c	c
1	1	1	1	0	1	1	1

STATUS = F0H  
ID = 43H  
INST. CLASS = 76H  
FORMAT NO. = 03H

DATA  
(DESCRIBED BELOW)

CHECK SUM DATA = TWO'S COMPLEMENT OF 7BITS SUM OF ALL DATA BYTES.  
EOX = F7H

##### DATA CONTENTS

NOTICE: FOLLOWING DATA BYTES ARE TO BE DIVIDED INTO 4BIT DATA AND SENT AS LESS-SIGNIFICANT 4BITS OF DATA PART. SIGNIFICANT 4BITS ARE SENT FIRST.

7	6	5	4	3	2	1	0
0							
2							
33							
34							
65							
65							
73							
314							
321							
322							
323							
324							
325							
326							
357							

BANK#: BANK# TO WHICH FOLLOWING DATA MUST BE SENT.  
THIS DATA IS IGNORED.

XXXX = DOES NOT MATTER

Q: QUANTIZE FOR CUSTOM DRUMMER INPUT.0: 1/4, 1:1/3

BEAT: BEAT LENGTH OF THIS PATTERN

000 = 1BEAT

001 = 2BEATS

?

111 = 8BEATS

INSTRUMENT SELECT

R A I I I I I I

I I I I I: INSTRUMENT NUMBER

A: ACCENT1 FLAG 1: ACCENT1, 0: NORMAL

R: ROLL FLAG 1: ROLL, 0: NORMAL

QUANTIZE DATA

A B C D E F G H

A: QUANTIZE OF 1ST BEAT.

B: QUANTIZE OF 2ND BEAT.

H: QUANTIZE OF 8TH BEAT.

0: 1/8, 1:1/6

ON TIMING DATA

a b c d e f g h

a: 1ST TIMING OF A BEAT.

b: 2ND TIMING OF A BEAT.

h: 8TH TIMING OF A BEAT.

1:ON, 0:NO ACTION

VOLUME DATA (NORMAL, ACCENT1, NORMAL ROLL, ACCENT1 ROLL)

0 0 0 V V V V V

VVVVV: VOLUME VALUE 0 ~ 31. 0: MAX, 31: MIN

ACC2: ACCENT2 FLAG 1:ON, 0:OFF

ACC2 STANDS FOR AN INSTANT ACCENT (3 POINTS UP) FOR EACH TRACK. ACCENT2 WORKS PRIOR TO ACCENT1.

NOTICE: ANY DATA WHICH EXCEEDS THE LIMITS SHOWN ABOVE MAY CAUSE UNEXPECTED TROUBLE ON SLAVE INSTRUMENT.

[PORTABLE KEYBOARD]

Model PSS-480		Mode 00		MIDI Implementation Chart					Version: 1.0		
Function		Manual/ Melody Memory Play	Transmitted Orchestra						Recognized	Remarks	
			Chord	1	2	3	Base	Rhythm			
Basic Channel	Default Changed	1-16 (*1) 1-16	11	12	13	14	15	16	1-16 (*2) 1-16		
Mode	Default Messages Altered	3	3	4	4	4	4	3	1 (*2) x x		
		*****									
Note Number:	True voice	24-108 (*3) *****								36-96 36-96 (*4)	
Velocity	Note ON Note OFF	x 9nH, v = 1-127 (*5) x 9nH, v = 0								x 9nH x 9nH, v = 0 /8nH	
After Touch	Key's Ch's	x x								x x	
Pitch Bender		x	x					x	x	7 bit reso.	
Control Change	1	○				x			○	VIBRATO SW	
	64	○				x			○	SUSTAIN SW	
	65	○				x			○	PORTAMENT SW	
Prog Change :	True	○ 0-104 (*6) *****								(*)7 ○ 0-99 ○ 0-127 (*8) 0-99	
System Exclusive		○								○	
System Common	: Song Pos : Song Sel : Tune	x x x								x x x	
System Real Time	: Clock : Commands	○ ○								○ x Alternative ○	Start, Stop
Aux Mes-sages	: Local ON/OFF : All Notes OFF : Active Sense : Reset	x x ○ x								x x ○ x	
Note: (*1) When the power is turned OFF, the data is stored. (*2) All channels from 1 to 16 can be turned ON/OFF selectively, and the data is stored when the power is turned off. (*3) Including the effective key area after transposing. (*4) Ch16 is reserved for the rhythm section. (*5) Velocity value is obtained by varying the melody volume, rather than key-on speed. (*6) 0-99 are transmitted corresponding to the voices #00-99. 100-104 corresponds to the DIGITAL SYNTH BANK 1-5. (*7) Transmitted corresponding to Style #00-99.											

Function		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1-16 (*1) 1-16	1-16 (*2) 1-16	
Mode	Default Messages Altered	3 × *****	3 (*9) × ×	
Note Number:	True voice	24-96(*3) *****	24-108 24-108 (*4)	
Velocity	Note ON Note OFF	× 9nH, v = 1-127 (*5) × 9nH, v = 0	○ 9nH, v = 1-127 × 9nH, v = 0 /8nH	
After Touch	Key's Ch's	× ×	× ×	
Pitch Bender		×	○	7bit Resolution
Control Change	1	○	○	VIBRATO SW
	64	○	○	SUSTAIN SW
	65	○	×	PORTAMENT SW
Prog Change :	True	○ (*10) *****	○ 0-127 (*11) 0-99	
System Exclusive		○	○	
System Common	: Song Pos : Song Sel : Tune	× × ×	× × ×	
System Real Time	: Clock : Commands	× ×	× ×	
Aux Mes-sages	: Local ON/OFF : All Notes OFF : Active Sense : Reset	× × ○ ×	× × ○ ×	

Note: (\*8) For the channels from 1 to 15, 0-99, 100-104 and 105-127 are recognized corresponding to the voices #00-99, the DIGITAL SYNTH BANK 1-5 and voices #00-22 respectively. For the 16th, 0-99 and 100-127 correspond to Style #00-99 and Style #00-27 respectively.

(\*9) Multi timbre, Dynamic allocation. Refer to page 34.

(\*10) For transmission, 00-99 and 100-104 correspond to voices #00-99 and the DIGITAL SYNTH BANK 1-5 respectively in the VOICE SELECTION. In the STYLE SELECTION, 00-99 are transmitted via Ch16 corresponding to #00-99.

(\*11) Channels 1 through 15 recognize 0-99, 100-104 and 105-127 as voices #00-99, the DIGITAL SYNTH BANK 1-5 and voices #00-22. Ch16 does not recognize any signals.

- This applies only to products distributed by Yamaha Music Corp.
- Dies bezieht sich nur auf die von der YAMAHA MUSIC COR. vertriebenen Produkte.
- Ceci ne s'applique qu'aux produits distribués par Yamaha Music Corp.
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### Attention users in the U.S.A. PortaSound PSS-480 prepared in accordance with FCC rules.

The PortaSound PSS-480 uses frequencies that appear in the radio frequency range, and if installed in the immediate proximity (within three meters) of some types of audio or video devices interference may occur.

The PortaSound PSS-480 has been type tested and found to comply with the specifications set for a Class B computing device in accordance with those specifications listed in Subpart J of Part 15 of the FCC rules. These rules are designed to provide a reasonable measure of protection against such interference. However, this does not guarantee that interference will not occur.

If your PortaSound PSS-480 should be suspected of causing interference with other electronic devices, verification can be made by turning your PortaSound PSS-480 off and on. If the interference continues when your PortaSound PSS-480 is off, the PortaSound PSS-480 is not the source of the interference. If your PortaSound PSS-480 does appear to be the source of the interference, you should try to correct the situation by using one or more of the following measures:

Relocate either the PortaSound PSS-480 or the electronic device that is being affected by the interference.

Utilize power outlets for the PortaSound PSS-480 and the device being affected that are on different branch (circuit breaker or fuse) circuits, or install A/C line filters.

In the case of radio-TV interference, relocate the antenna or, if the antenna lead-in is a 300 ohm ribbon lead, change the lead-in to a co-axial type cable.

If these corrective measures do not produce satisfactory results, please contact your Authorized Yamaha Consumer Products dealer for suggestions and/or corrective measures.

If you cannot locate an Authorized Yamaha Consumer Products dealer in your general area, contact the Consumer Products Service Center, Yamaha Music Corporation, 6600 Orangethorpe Ave, Buena Park, CA 90620.

If for any reason you should need additional information relating to radio or TV interference, you may find a booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402—  
Stock # 004-000-345-4.

- This applies only to products distributed by YAMAHA Europe GmbH.
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Wichtiger Hinweis für die Benutzung in der Bundesrepublik Deutschland.

#### Bescheinigung des Importeurs

Hiermit wird bescheinigt, daß der/die/das  
Musikinstrument Typ PSS-480

(Gerät, Typ, Bezeichnung)

in Übereinstimmung mit den Bestimmungen der  
VERFÜGUNG 1046/84

(Amtsblattverfügung)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Yamaha Europa GmbH

Name des Importeurs

The serial number of this product may be found on the bottom of the unit. You should note this serial number in the space provided below and retain this manual as a permanent record of your purchase to aid identification in the event of theft.

Model No. PSS-480

Serial No. \_\_\_\_\_

#### Concerning Warranty

This product was made for international distribution, and since the warranty for this type of product varies from marketing area to marketing area, please contact the selling agency for information concerning the applicable warranty and/or service policies.

Die Seriennummer befindet sich an der Unterseite des Instrumentes. Wir empfehlen, diese Nummer sicherheitshalber an der unten vorgesehenen Stelle einzutragen, um sie auch im Falle eines Diebstahls jederzeit zur Hand zu haben.

Modell-Nr. PSS-480

Serien-Nr. \_\_\_\_\_

#### Hinweis zur Garantie

Dieses Produkt wird international vertrieben, und die Garantiebedingungen sind von Vertriebsland zu Vertriebsland verschieden. Ihr Händler gibt Ihnen gerne genauere Informationen zu den in Ihrem Land gültigen Garantie- und/oder Servicebedingungen.

Le numéro de série de ce produit figure sur le socle. Il conviendra de noter ce numéro de série dans l'espace réservé ci-dessous et de conserver ce manuel: celui-ci constitue le document permanent de votre achat et permet l'identification en cas de vol.

Modèle No. PSS-480

No. de série: \_\_\_\_\_

#### Remarque relative à la garantie

Ce modèle est destiné à être distribué à l'échelle internationale. Etant donné que les conditions de garantie pour ce type de produit varient en fonction des zones de commercialisation, prière de prendre contact avec l'agence chargée des ventes pour tous renseignements relatifs aux conditions de garantie et de service après-vente.

El número de serie de este producto se encuentra en la parte inferior de la unidad. Sirvase anotar este número de serie en el espacio proporcionado debajo y guarde este manual como comprobante de compra para ayudar a la identificación en caso de robo.

Nº de modelo PSS-480

Nº de serie: \_\_\_\_\_

#### Concerniente a la garantía

Este producto ha sido fabricado para ser distribuido internacionalmente y, como la garantía para este tipo de producto varía en relación a su área de comercialización, sirvase consultar con el agente de ventas sobre la información en torno a la garantía aplicable y/o políticas de servicio.

# YAMAHA

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